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CALAVERAS PIPELINE REPLACEMENT ENVIRONMENTAL IMPACT REPORT

DRAFT EIR PUBLICATION DATE: [MAY 18, 1990]
DRAFT EIR PUBLIC HEARING DATE: [JUNE 21, 1990]
DRAFT EIR PUBLIC COMMENT PERIOD: [MAY 18, 1990 - JULY 2, 1990]

WRITTEN COMMENTS SHOULD BE SENT TO:
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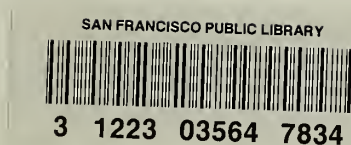
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REQUEST FOR FINAL ENVIRONMENTAL IMPACT REPORT

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Re: Calaveras Pipeline Replacement

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May 18, 1990

TO: Distribution List for the Calaveras Pipeline Replacement Project
Department of City Planning File No. 89.112E

FROM: Barabara W. Sahm, Environmental Review Officer

SUBJECT: Request for the Final Environmental Impact Report

This is the draft of the Environmental Impact Report (EIR) for the Calaveras Pipeline Replacement and Associated Improvements Project. A public hearing will be held on the adequacy and the accuracy of this document on June 21, 1990. After the public hearing, our office will prepare and publish a document titled "Summary of Comments and Responses" which will contain a summary of all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR. Those who testify at the hearing or submit written comments on the Draft EIR will automatically receive a copy of the Comments and Responses document along with notice of the date reserved for certification (usually about nine weeks after the hearing on the Draft); others may receive such copies and notice on request or by visiting our office. This Draft EIR, together with the Summary of Comments and Responses document, will be considered by the City Planning Commission in an advertised public meeting and certified as a Final EIR if deemed adequate.

After certification, we will modify the Draft EIR as specified by the Comments and Responses document and print both documents in a single publication called the Final Environmental Impact Report. The Final EIR will add no new information to the combination of the documents except to reproduce the certification resolution. It will simply provide the information in one rather than two documents. Therefore, if you receive a copy of the Comments and Responses document in addition to this copy of the Draft EIR, you will technically have a copy of the Final EIR.

We are aware that many people who receive the Draft EIR and the Summary of Comments and Responses have an interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR to private individuals only if they request them.

TABLE OF CONTENTS

	<u>Page</u>
I. Summary	
A. Project Description	1
B. Significant Potential Environmental Impacts	2
C. Mitigation Measures	4
D. Alternatives	5
II. Project Description	
A. Objectives	9
B. Project Location	11
C. Project Description	11
D. Project Approvals, Schedule and Costs	22
III. Environmental Setting	
A. Wildlife and Biological Resources	29
B. Cultural Resources	50
C. Geology, Seismicity and Soils	53
D. Visual Quality	63
E. Transportation	72
F. Noise	78
G. Air Quality	79
H. Water Quality	85
I. Hazards	87
IV. Environmental Impacts	
A. Wildlife and Biological Resources	89
B. Cultural Resources	98
C. Geology, Seismicity and Soils	101
D. Visual Quality	104
E. Transportation	111
F. Noise	114
G. Air Quality	116
H. Water Quality	120
I. Hazards	121
V. Mitigation Measures	
A. Wildlife and Biological Resources	123
B. Cultural Resources	129
C. Geology, Seismicity and Soils	132
D. Visual Quality	136
E. Transportation	138
F. Noise	140
G. Air Quality	141
H. Water Quality	143
I. Hazards	144

TABLE OF CONTENTS (Continued)	<u>Page</u>
VI. Significant Environmental Effects That Cannot Be Avoided If the Proposed Project is Implemented	145
VII. Alternatives to the Proposed Project	
A. No Project Alternative	147
B. Alternative Alignment	148
C. Replacement with 44-inch Pipe	150
D. Creek Transfer Alternative	151
VIII. DEIR Distribution List	157
IX. Appendices	
A. Initial Study	A-1
B. Common, Potential and Observed Wildlife Species in the Project Area	A-21
C. Geotechnical Survey Report	A-28
D. Geology Maps - April 1990	
X. EIR Authors	A-81

LIST OF FIGURES

	<u>Page</u>
1. Regional Location Map	12
2. Site Plan	13
3. Typical Pipeline Cross Section on Hillside	16
4. Plan View of San Antonio Pump Station	21
5. Calaveras Outlet Tower and Tunnel	23
6. Cross Section of Outlet Tower	25
7. Site Photo	33
8. Site Photo	34
9. Site Photo	35
10. Geologic Map	57
11. Alquist Priolo Special Studies Zone Map	61
12. Photo Location Map	65
13. Site Photos	67
14. Site Photos	68
15. Site Photos	69
16. Location of Traffic Counts	75
17. Areas of Potential Biological Impact	93

LIST OF TABLES

1. Potential Special Status Species in Project Area	41
2. Existing Traffic Volumes	73
3. Traffic Counts and 85-Percent	74
4. Federal and State Ambient Air Quality Standards	80
5. Health Effects Summary of the Criteria Air Pollutants	81
6. Air Pollutant Data Summary	84
7. Emissions from Construction Activities	117



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I. SUMMARY

A. PROJECT DESCRIPTION

The Water Department of the City and County of San Francisco proposes to replace the deteriorated 44-inch Calaveras water pipeline, which extends approximately 5.5 miles from the Calaveras Reservoir in southern Alameda County to the San Antonio Pump Station, with a new and larger (66-inch) pipe. Calaveras pipeline is used to convey raw water from the reservoir to the Sunol Valley Water Treatment Plant (SVWTP) and to transfer reserves from Calaveras Reservoir to the San Antonio Reservoir.

There are three major components to the proposed project: 1)replacement of the pipeline; 2)modifications to the San Antonio Pump Station; and 3)improvements to the outlet facilities at Calaveras Reservoir. The latter two improvements would occur at the sites of the existing facilities and would be smaller in scale and cost than the pipeline replacement. The projects are being designed by the Utilities Engineering Bureau of the City and County of San Francisco.

The primary project component entails removal of approximately one-third of the existing 44-inch pipeline, widening the trench it is buried in or excavating a new trench alongside portions of existing pipeline which would remain in place, and laying a new 66-inch pipeline in the trench. The new replacement pipeline would be entirely underground. In some places deviations from the existing alignment would be made in order to improve access to the pipeline for maintenance purposes and to avoid unstable slopes. Five existing trestled creek crossings would be removed, the sites rehabilitated, and the new pipeline installed underground in order to reduce visual impacts of the pipeline and its attraction for vandals.

At the San Antonio Pump Station three new electric pumps would be added to the existing facilities and a 21-kV distribution line, with three outdoor substations, would be installed

along Calaveras Road to supply power from the Hetch Hetchy transmission line to the pump station and to the Sunol Valley Water Treatment Plant. In addition, two existing underground diesel fuel storage tanks would be removed and replaced with above-ground tanks. Other improvements at the pump station would include expansion of the existing building and construction of a pre-fabricated shelter over the existing berm for hazardous material overflow. All work on the San Antonio Pump Station, including installation of the powerline, would occur on SFWD-owned land.

The outdated and deteriorating internal components of the outlet facilities of Calaveras Dam would also be replaced as a part of this project. In order to be compatible with the capacity of the new pipeline, the capacity of the Calaveras outlet works would be increased from 75 million gallons per day (MGD) to 160 MGD. All internal components of the outlet works would be replaced. This includes the outlet valves, the standpipe and pipeline, the electrical wiring and control system, and the steel platform, stairs and handrailing. No work is planned for the exterior of the outlet facilities.

B. POTENTIAL ENVIRONMENTAL IMPACTS

Wildlife and Biological Resources (pages 89 through 97)

There will be environmental impacts caused by this project to biological and geological resources and to visual quality of the project area. The new pipeline would cross under Alameda Creek five times and would require construction in less than one-third mile of floodplains. These activities would remove some mature riparian trees and temporarily disturb the creek corridors. Downstream water quality would be temporarily degraded as sediment was stirred up by in-stream construction activities. Pipeline work outside riparian areas would remove additional mature trees. Earthmoving and construction noise would temporarily disturb wildlife. Partial drainage of the Calaveras Reservoir could temporarily affect aquatic flora and fauna.

Cultural Resources (pages 98 through 100)

Significant archaeological artifacts, including human burials or remains, could be encountered during project construction activities. A bedrock milling station could be adversely impacted by project construction activities; however, as this feature is outside the direct construction zone, this effect is unlikely.

Geology, Seismicity and Soils (pages 101 through 103)

Slopes would be exposed during construction through the removal of covering vegetation and topsoil and the laying back or cutting of slopes to provide working area for trenching operations. Such exposed slopes would be subject to erosion if not properly restored after construction. Additionally, excavation would take place in some areas at the base of steep, potentially unstable slopes. Failure of these slopes during construction could result in injury or death. The same hazard could exist at stream crossings, where a combination of high ground water and the presence of unconsolidated soils could create unstable slopes in the trench excavation during construction. Finally, removal of vegetation from the stream banks would expose the banks to increased erosion.

Visual Quality (pages 104 through 110)

Visual impacts would occur through removal of vegetation for construction activities. Five mature trees conflict with the pipeline alignment and would be removed. Construction activities, as well as storage and staging areas, would result in short-term impacts which would detrimentally affect the visual character of the project corridor as viewed from area roads and trails. As proposed, the electric distribution line and substations would create an adverse visual impact along Calaveras Road, which has been designated by Alameda County as a Scenic Route.

Transportation (pages 111 through 113)

Traffic along Calaveras Road and Geary Road could be impeded by construction activities and traffic. Slow-moving construction traffic could create a potential for rear-end collisions by faster traffic. Internal Sunol Wilderness Area circulation and parking would be temporarily disrupted. Heavy construction equipment would damage park and county roads.

Noise (pages 114 through 115)

The project would result in temporary increases of ambient noise along and near active portions of the pipe trench during construction. It may be necessary to use blasting along some portions of the alignment that are blocked by large boulders. This would result in high peak noise levels of short-term duration. Haul trucks and other machinery would increase noise levels along Calaveras Road throughout project construction and along

Geary Road in the Sunol Regional Wilderness Area during one two-month period. Construction noise would intrude into otherwise quiet environments.

Air Quality (pages 116 through 119)

Small quantities (relative to ambient air quality) of pollutants and particulate matter would be emitted by construction equipment and by vehicles slowed or stopped by project construction. Spot violations of CO standards could occur. Clearing, excavation, and grading activities, along with natural wind, would all generate dust temporarily increasing TSP and PM₁₀ concentrations and potentially leading to violation of federal and State 24-hour standards.

Water Quality (page 120)

Soil eroded during construction could adversely affect water quality during the following rainy season, especially under high- or storm-flow conditions.

Hazards (page 121)

Rupture of the pipeline due to an earthquake would result in local flooding. This would not pose a hazard to human health.

C. MITIGATION MEASURES

Some of the mitigation measures included in the proposed project are listed below. The complete list of mitigation measures, both those included in the project and those not included, is found in Section V, pages 123 through 144.

Wildlife and Biological Resources

- o All removed trees would be replaced with trees of the same species on a ten-to-one basis, with a five-year maintenance and monitoring program, and supplemental planting when necessary.
- o Operation of construction equipment would be restricted to the minimum area necessary and careful construction practices would be followed in order to minimize damage to nearby trees and other vegetation.
- o The disturbed riparian corridor would be revegetated after construction with a five-year maintenance and monitoring program, with supplemental planting as necessary.

- o Construction within creek channels should occur during the April to October dry season.
- o Permits for construction affecting Alameda Creek, with contingent conditions, would be required by the California Department of Fish and Game, the U.S. Army Corps of Engineers, and the California State Water Quality Control Board.

Cultural Resources

- o A qualified archaeologist will monitor excavation within the vicinity of site CA-Ala-428H (East Bay Regional Park District's Sunol Wilderness Area).
- o If resources of significance or potential significance are encountered during on-site monitoring, all construction excavation in an area within 100 feet of the find would cease until the monitoring archaeologist has had the opportunity to examine the finds, assess their significance and offer proposals to investigate and mitigate adverse impacts.
- o In the event that a find entails human remains, California law stipulates that the Medical Examiner Office be immediately notified. The monitoring archaeologist will also notify the Native American Heritage Commission.

Geology, Seismicity and Soils

- o For construction work on steep slopes, the construction swath should be limited as much as possible, preferably to the width of a mobile crane.
- o The height of cuts across slopes will be maintained within safe limits.
- o Erosion control measures should be practiced on all disturbed areas during and immediately following completion of pipeline construction. Such measures include diversion of water away from graded areas via cross ditches, berms, and other controls, and revegetation.
- o Trench plugs should be used to reduce erosion within the pipeline trench as well as on steep pipeline slopes. At stream crossings, the trenches would be shored to protect workers.
- o Unstable slopes should be stabilized by buttressing, dewatering the slide mass, installing piles or anchors, or by chemically treating the slide plane to increase its shear strength.

Visual Quality

- o Revegetation and replanting of trees would mitigate some of the visual impacts of the project.
- o During construction, storage areas should be limited in size and screened from view by temporary fencing.

- o If the 21-kV transmission line is installed underground, a potential visual impact would be eliminated. As a second-best option, the transmission line could be installed on the existing distribution pole line along the west side of Calaveras Road. Substations should be screened from view with fencing and landscaping.

D. ALTERNATIVES

No Project

Under this alternative the project would not be built and no changes to the existing situation would occur. The environmental characteristics of this alternative would be as described in the Environmental Setting sections of this report (see Chapter III, Setting, pages 29 through 88 for a discussion of existing conditions) and no environmental impacts would occur as a result of adoption of this alternative.

Alternative Alignment

This alternative would entail placing the pipeline under the roadway of Geary Road. The pipeline would be trenched under the road approximately from the confluence of Alameda and Calaveras creeks, about 3000 feet downstream of Calaveras Reservoir, to the point where Geary Road joins Calaveras Road. From here the pipeline would either be placed under Calaveras Road for the remainder of its length, or it would follow the alignment of the proposed project to its terminus at the San Antonio Pump Station.

Where Geary Road crosses a particularly steep slope and narrows to a single lane, geological and biological impacts would occur with implementation of this alternative. The stability of the slope would be disturbed, possibly resulting in slope failure and landslide. The pipeline would probably rupture in such an event, causing flooding and erosion. Shoring and re-profiling of this slope would entail removal of all vegetation downstream of the slope. This would also result in increased erosion. In addition, Geary Road would be closed to traffic during construction.

Other biological and visual quality impacts would be the same as described for the proposed project.

Replacement with 44-inch Pipeline

Under this alternative the existing deteriorating 44-inch pipeline would be replaced in the same alignment with new 44-inch pipe. Impacts to wildlife and biological resources under

this alternative would be the same as for the proposed project. Geologic impacts would also be the same, although the risk of flooding and consequent erosion resulting from pipeline rupture caused by slope failure would be slightly greater than for the proposed project because the proposed project would avoid some of the more unstable slopes currently crossed by the Calaveras pipeline.

Creek Transfer Alternative

This alternative would include all of the proposed project plus the release of water from Calaveras Reservoir into the Alameda Creek channel in order to re-create historical trout habitat. The released water would be recaptured downstream at the Sunol Pump Station and pumped to San Antonio Reservoir for storage. This alternative would result in all of the same impacts as the proposed project, plus additional impacts to geology and energy resources. Increased saturation of soils around the creek would result in increased potential for liquifaction in the event of an earthquake. Electric pumping of water would require more energy resources than are currently required.

II. PROJECT DESCRIPTION

A. OBJECTIVES OF THE PROJECT SPONSOR

The City and County of San Francisco proposes to replace the Calaveras pipeline, which extends approximately 5.5 miles from the Calaveras Reservoir to the San Antonio Pump Station. This pipeline conveys raw water from the reservoir to the Sunol Valley Water Treatment Plant (SVWTP) and transfers reserves from Calaveras Reservoir to the San Antonio Reservoir.

There are three major components to the proposed project: 1) replacement of the actual pipeline; 2) modifications to the San Antonio Pump Station; and 3) improvements to the outlet facilities at Calaveras Reservoir. The latter two improvements would occur at the sites of the existing facilities and would be smaller in scale and cost than the pipeline replacement. Each component is described below. Each of the three project components is a separate bond project sponsored by the San Francisco Water Department (SFWD). The projects are being designed by the Utilities Engineering Bureau of the City and County of San Francisco.

The project sponsor has several objectives in undertaking the pipeline project. Replacement is required because of the deteriorated condition of the existing 57-year old pipe. The existing pipe now leaks and is increasingly susceptible to rupture. An increase in the pipe size is proposed to enable the Water Department to meet potential emergency outages in the Hetch Hetchy system, which provides over 80 percent of the potable water to the SFWD customers. In the event of a Hetch Hetchy outage, Calaveras water would replace some of the lost Hetch Hetchy water. This capability would also enable the Department to periodically shut down the Hetch Hetchy system for short-term rehabilitation work. With the project, deliveries to the San Francisco Water Department service area would not increase. The larger pipe would also enable the SFWD to transfer water

from Calaveras Reservoir to San Antonio Reservoir more quickly to reserve water for use by the water department. Historically, the storage of the waters of Alameda Creek and Calaveras Creek in Calaveras Reservoir is based upon pre-1914 Civil Code filings of the Spring Valley Water Company. The Spring Valley Water Company was acquired by the SFWD in 1930. The storage filing at Calaveras is for all of the water of Calaveras Creek. The diversion and storage filing for the Alameda Diversion Dam amounts to 150,000 miner's inches, or 3,000 cubic feet per second.

Calaveras Reservoir does not store imported water from the Hetch Hetchy system. The reservoir receives inflow from Calaveras Creek and from the adjacent upper Alameda Creek watershed via the Alameda Diversion dam and tunnel. The Alameda Diversion Dam does not function as a storage reservoir but rather diverts winter flows for storage in Calaveras Reservoir.

By modifying the present alignment in selected segments, slides and unstable slopes through which the current pipeline passes would be avoided. Some deviations would improve access to the pipeline; some offer greater ease of construction. The SFWD desires to underground portions of the pipeline which are currently above ground in order to reduce maintenance requirements and vandalism, and limit public exposure, thus minimizing liability to SFWD. The SFWD also hopes to reduce the visual impact of the pipeline through this action.

Modifications to the San Antonio Pump Station would include installation of three new electric pumps to supplement existing pumps. This would provide SFWD with increased pumping capacity in an emergency when it was necessary to utilize the increased capacity of the pipeline. This would also reduce maintenance requirements and energy consumption at the pump station. The existing pumps run on diesel fuel and are subject to frequent maintenance and repairs. The electric pumps would be quieter and have lower energy and maintenance requirements. The new pumps would be used during normal operations and the existing pumps would only be used when additional pumping capacity was required. The Water Department's objective in replacing two underground fuel tanks is to bring them into compliance with State regulations which require the tanks to be double-walled.

The outlet facilities at Calaveras Reservoir would be replaced because the present facilities, built in 1925, are outdated and deteriorating. The outlet capacity would be increased in order to accommodate the increased capacity of the pipeline--again, to be used only during emergency loss of available Hetch Hetchy water. Some of the control valves at the dam would be replaced in order to increase operational flexibility.

B. PROJECT LOCATION

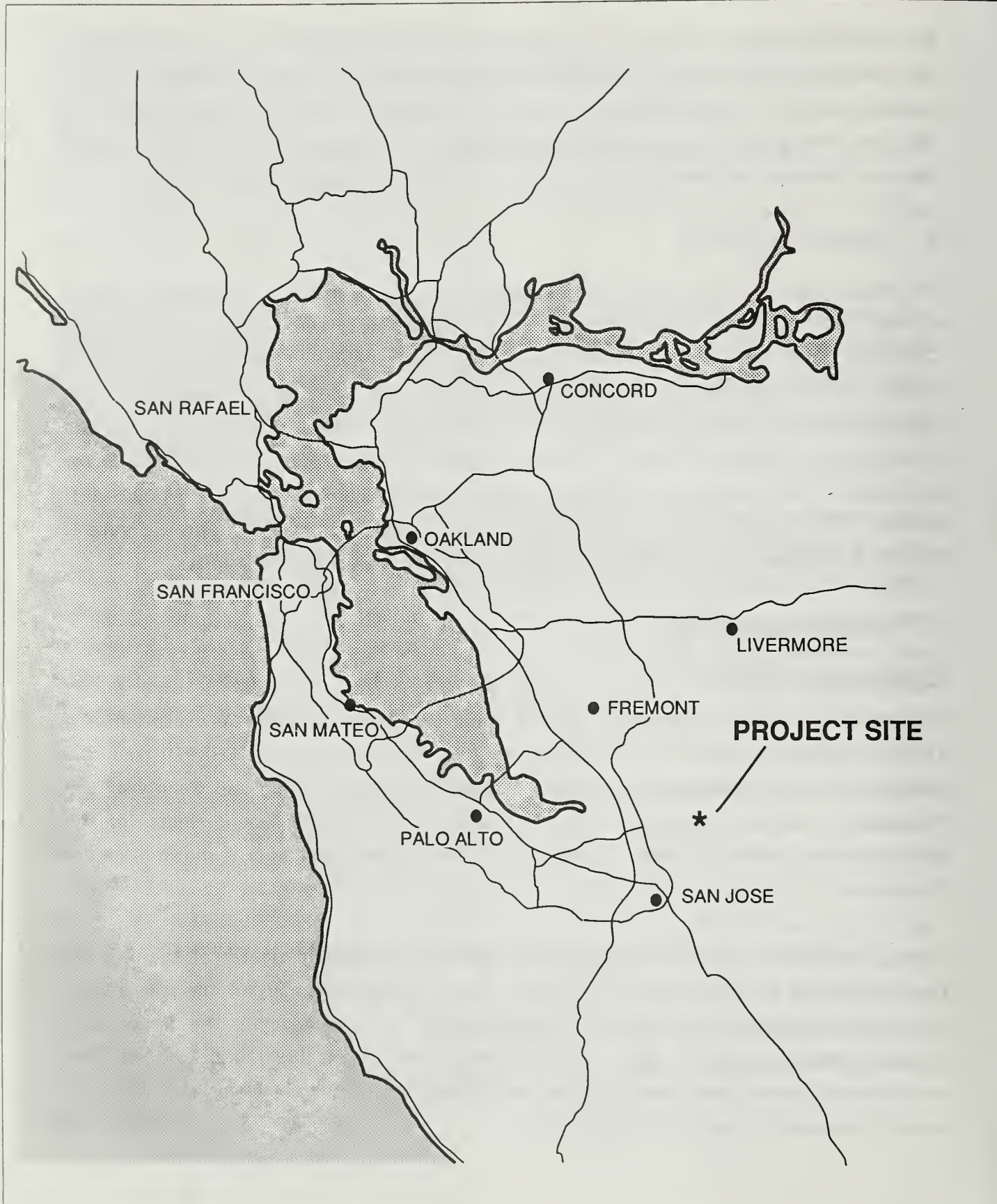
The proposed project area is located in southern Alameda County. The Calaveras Pipeline extends from Calaveras Reservoir to the Sunol Valley Water Treatment Plant, located on Calaveras Road, just north of its intersection with Geary Road. From there the pipeline extends further to the San Antonio Pump Station, also located on Calaveras Road, approximately one and a half miles south of its intersection with Highway 680. The length of alignment is about 5.5 miles. The entire alignment and surrounding area is zoned for agriculture. The project site occupies Assessor's parcel numbers 96-80-8, 96-100-14-1, 96-100-24-2, 96-100-25, 96-100-27, and 96-100-28. The project area is shown in Figure 1. Sunol is the nearest community to the project area; the nearest city is Milpitas.

C. PROJECT DESCRIPTION

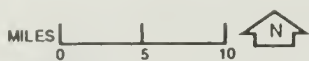
Replacement of Pipeline

The entire 5.5 miles of Calaveras pipeline would be replaced. With the exception of a 1200-foot pipeline segment through East Bay Regional Park District (EBRPD) land, the project would lie entirely within watershed lands owned by the City and County of San Francisco in southern Alameda County. The City owns the easement rights for the portion of the pipeline that lies in EBRPD land. The pipeline alignment is shown in Figure 2.

During the replacement it is proposed to increase the internal diameter of the pipeline from 44-inch to 66-inch in order to improve the hydraulic efficiency of the pipe and to improve its capability to transfer water quickly in an emergency. The larger pipe diameter would enable the San Francisco Water Department (SFWD) to control flow velocities to 13 feet per second or less; velocities above this rate have been shown to result in accelerated erosion of pipe walls.



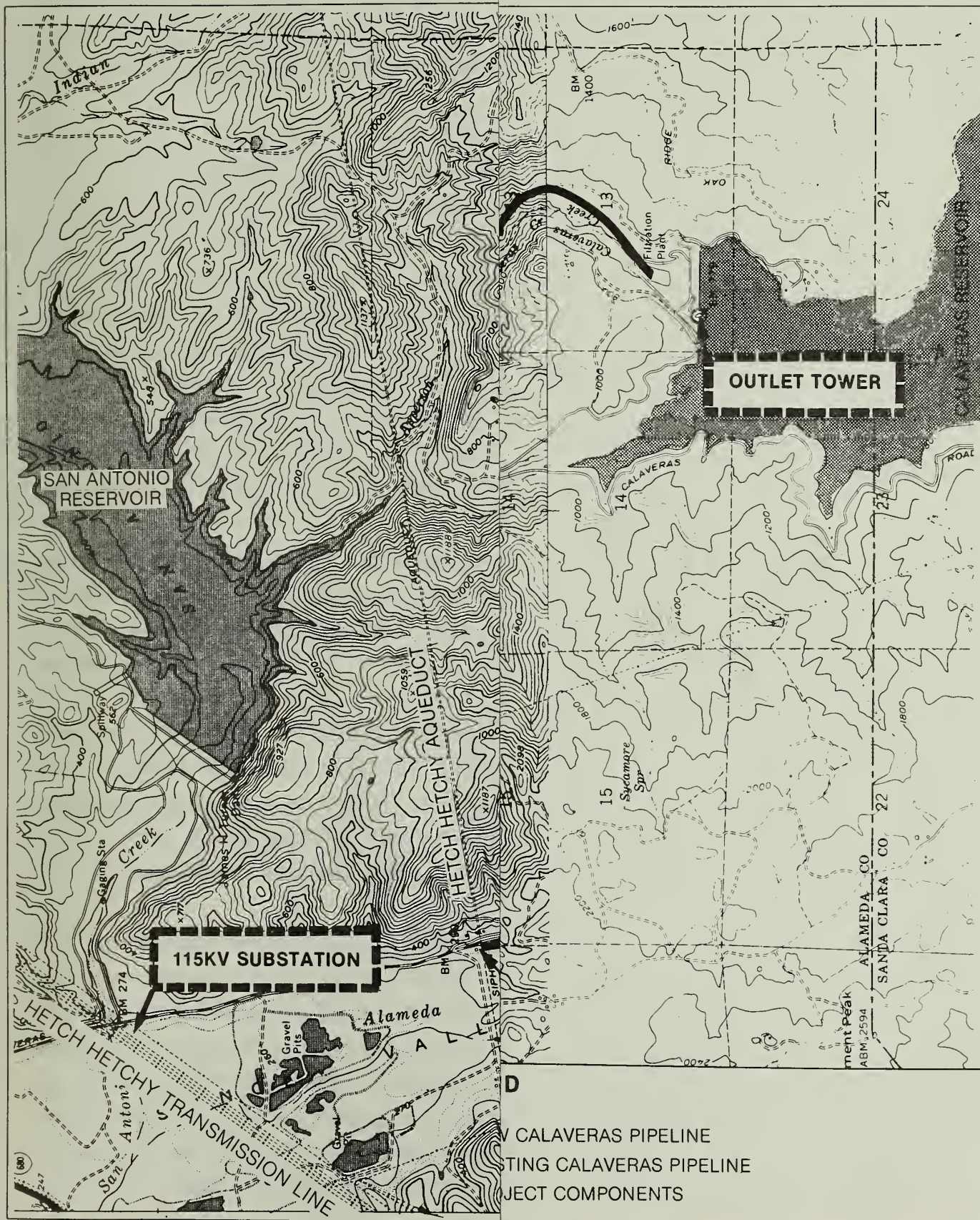
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SITE PLAN

FIGURE 2



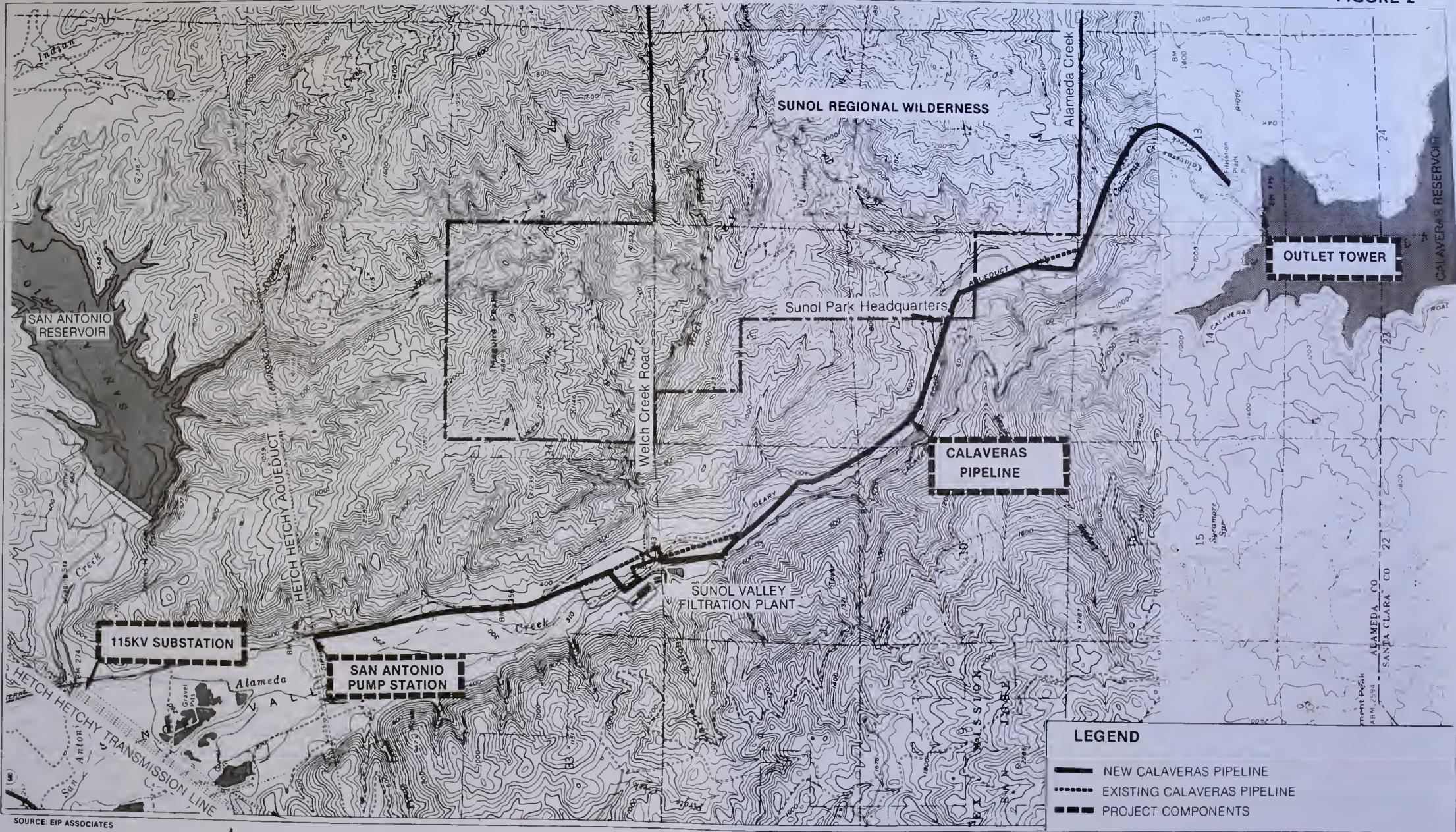
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SITE PLAN

FIGURE 2



SOURCE: EIP ASSOCIATES

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The new pipe would either be steel lined with concrete or pre-stressed concrete. The steel pipe would have an external diameter of approximately 68 inches. The external diameter of the concrete pipe would be approximately 76 inches.

The new pipeline would generally follow the alignment of the existing pipeline. However, portions of the existing alignment would be modified in places in order to improve access for maintenance and to avoid unstable slopes. In order to minimize visual impact of creek crossings and to attract fewer vandals, the new crossings would pass under the flow line of the creek. Five existing trestled creek crossings would be removed, with the sites rehabilitated. The only permanent alteration of terrain anticipated during construction of the pipeline alignment would be limited expansion of the existing access roads and the creation of new access roads where the new alignment would deviate from the existing alignment. There would be modification of the topography during construction; however, after the pipeline is replaced, the ground levels would be restored and revegetated in visually sensitive areas such as the park.

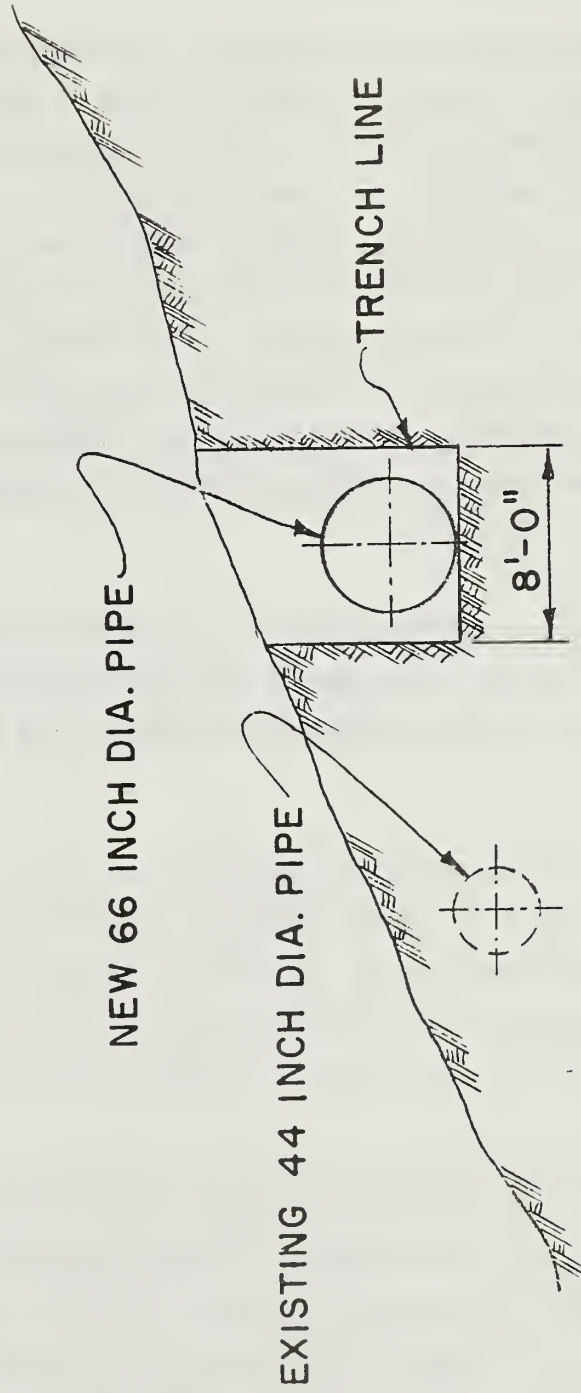
Just downstream of the dam is a 1,000-foot section of pipeline housed in an eight-foot-diameter tunnel. The 44-inch pipe would be removed and replaced with 66-inch pipe. Modifications to the tunnel would be unnecessary, although it may be filled with grout sealant around the pipe.

The pipeline construction would require partial drainage of the reservoir; this would mean that no water deliveries would be made through the pipeline during construction. However, the segment of pipeline between the water treatment plant and the pump station would remain operational during construction; Hetch Hetchy water and/or water from the San Antonio Reservoir would be pumped to SVWTP for treatment.

The pipeline construction would generally begin with site preparation activities, involving bulldozers and scrapers to clear the topsoil and shrubbery in a 10- to 30-foot wide path as required, along the pipeline route. The pipeline trench would be excavated in this cleared swath. An overall swath of 50 feet would provide space both for the pipeline trench and an adjacent construction zone for equipment and trucks. No clearing would be required outside the 10- to 30-foot swath. Following site preparation, there would be trenching, excavation and pipelaying operations, requiring dozers, scrapers, a large backhoe or excavator, loaders, a mobile crane, dump trucks, and compactors.

FIGURE 3

TYPICAL PIPELINE CROSS-SECTION ON HILLSIDE



The trench would be about 8-feet wide. Although the depth would vary somewhat, the trench would generally be 9-feet 6-inches deep if a steel pipe is used, or 11-feet 6-inches if a concrete pipe is used. Figure 3 shows a typical cross section of the pipeline. The entire pipeline would be underground, with the exception of an exposed segment downstream of the tunnel at the southern end of the alignment. The excavated materials would be stockpiled and used for backfill and, depending on the contractor's decision, screened for bedding material for the pipe. The remainder of the spoils would be disposed of on SFWD lands by spreading in depressions, over the pipeline, and in other appropriate areas as directed by the project engineer. Approximately 59,000 cubic yards of spoils would be disposed of in this manner if steel pipe is installed; if concrete pipe is used, there would be approximately 33,000 cubic yards of spoils. The steel pipe, though smaller, results in more spoils because it has to be completely covered with sand, with an additional one foot of sand on top. The concrete pipe would be half covered in sand and the remainder of the trench would be backfilled with the excavated material. Sand for the first layer of trench backfill would be imported from nearby quarries. Steel pipe would require about 32,000 cubic yards of sand, while concrete pipe would require about 14,000 cubic yards.

Approximately one-third of the existing pipe, including all of that in Sunol Regional Wilderness Area boundaries, would be removed and trucked off-site. Where existing pipe is abandoned in place, it would be buried and/or sealed off, and the new trench pipe would be placed in a trench approximately 15 feet to the side of the old trench (except in places where major deviations from the previous alignment have been made).

Prefabricated piping would be laid by a mobile crane on the bedding material in the trenches and covered with backfill material. The site would then be restored to its original contour, and would be revegetated and/or landscaped, with replacement of existing graveled areas.

Special construction considerations would be required in some areas of the pipeline route. In the areas where the pipeline route crosses Alameda Creek, the pipeline would be installed under the creek and construction would occur during the dry season. Erosion control measures, such as silt screens or hay bales, would be employed to prevent downstream sedimentation, and riparian vegetation would be restored while mature trees

would be replaced on ten-to-one basis following construction. Trenching activities near the creek and in the floodplain areas may encounter groundwater, and dewatering would be required prior to laying the pipe. In some areas such as in the floodplain areas and along unstable slopes, the pipeline would be encased in concrete for protection. For hillside construction, the trenches would require sheet piling and shoring, and additional equipment, such as track-mounted bulldozers, would be needed for off-road and steep portions of the alignment. Hillside construction would also be conducted during the dry season and employ erosion control measures.

The pipeline would involve three road crossings; in those areas, trenching would occur in the roadway. The roads would be repaved following pipe installation. There is a liquid gas pipeline which crosses under the Calaveras pipeline, and construction would occur over it. A Chevron representative would supervise construction at the crossing of its gas pipeline, which is about ten feet deep, and protective measures would be taken to prevent damage to the gas line.

Additional geotechnical investigations would be necessary to determine the exact alignment and special construction requirements. Although no blasting is planned for trench excavation, small charges may be used to remove large boulders blocking the alignment along Calaveras Creek or in other portions of the alignment. These charges would break up the boulder into smaller pieces of rock, enabling their removal. Additional geotechnical investigations scheduled to occur between March and May of 1990 would determine the extent of excavation difficulties and whether or not more extensive blasting into bedrock would be required.

Construction in the upstream portions of the alignment would involve a substantial amount of hillside construction, with special equipment required for access to steep areas, as described above. Construction in the park areas would be coordinated with the East Bay Regional Park District to minimize disruption to park patrons; construction would occur during periods of low patronage, such as during the heat of summer. All above-ground portions of the existing pipeline, including five trestled creek crossings and some of the underground portions, would be removed during construction; most of the remaining portions of the existing underground pipeline would be blocked off and abandoned in place. A construction crew of 20-40 workers would be employed on the pipeline replacement work.

In the downstream portions of the alignment, the pipeline traverses fairly flat, open grassland, and portions of the alignment cross existing nurseries. Although all of this land is owned by SFWD, these wholesale nurseries lease the land where their operations are situated from the Water Department. Portions of the nurseries would be temporarily displaced, and there may be minor demolition of nursery irrigation systems or fencing, which would be replaced following pipeline construction. The existing pipeline between SVWTP and the pump station would be operational throughout construction with the exception of one or two minor shutdowns each lasting from one to two days.

Modifications to San Antonio Pump Station

Pumping capacity and reliability would be increased at the San Antonio Pump Station with the installation of three new electric pumps which would supplement the existing diesel pumps. These outdoor horizontal pumps would be located about 60 feet west of Calaveras Road. Pacific Gas and Electric (PG&E) has indicated that it would be unable to meet increased electrical demand of the pumps. The project sponsor therefore proposes to bring in power from the Hetch Hetchy transmission line via a 21-kilovolt (kV) transmission line. The line would extend from near the 115-kV crossing at Calaveras Road to the pump station, then on to the Sunol Valley Water Treatment Plant.

This line would be strung on new 40-foot wooden poles paralleling Calaveras Road for a distance of about three miles. At each end of it and at the pump station, conventional outdoor electrical substations, consisting of transformers and switchgear, would be constructed and surrounded by chain-link fencing. The power line and substations would be constructed entirely within SFWD property.

Improvements at San Antonio Pump Station would also include excavation and removal of two buried 9,000-gallon diesel fuel tanks and replacement with two above-ground tanks. The existing single-walled tanks are over 20 years old and may be corroded. The new tanks would each have a capacity of 9,000 gallons. They would be screened behind a masonry fence. In addition, a pre-fabricated shelter would be erected over the existing berm for temporary storage of hazardous materials such as lubricants and cleaning solvents. The existing pump station building would also be expanded as a part of this project. The 4,000 square-foot building would have an additional 700 square feet added to its east side facing Calaveras Road. This new space would be used to house switch gear

and would provide some additional office space. Figure 4 shows the pump station with the improvements that would be made.

Construction activities at the pump station would involve similar equipment as the pipeline replacement, such as earth-moving equipment, backhoe, loader, crane, etc. The existing parking lot at the pump station would be used as a staging area. Installation of the three new electric pumps would involve clearing and grading the site, pouring the concrete pad, installing the conduits, and installing the pumps. As mentioned previously, to meet the electrical demand for the new pumps, the proposed project would include a 21-kV transmission line extending from the existing 115-kV line crossing Calaveras Road to the pump station and continue to the Sunol Valley Water Treatment Plant for about three miles. Holes would be bored in the ground for inserting wooden poles, and the necessary hardware and transmission lines would be connected to the poles. Three conventional outdoor electrical substations would be constructed. Each substation would include outdoor transformers and possibly prefabricated shelters to house the switchgear and electrical cabinetry; chain-link fencing would be installed around the perimeter of the substations for security.

Excavation activities would include the removal of two existing underground fuel tanks and existing piping, as required by federal, State, and local guidelines.¹ The underground tanks would be replaced by aboveground tanks, which would involve construction of a concrete pad with a berm for spill protection and security fencing. A fence would be constructed to screen the aboveground tanks from the road.

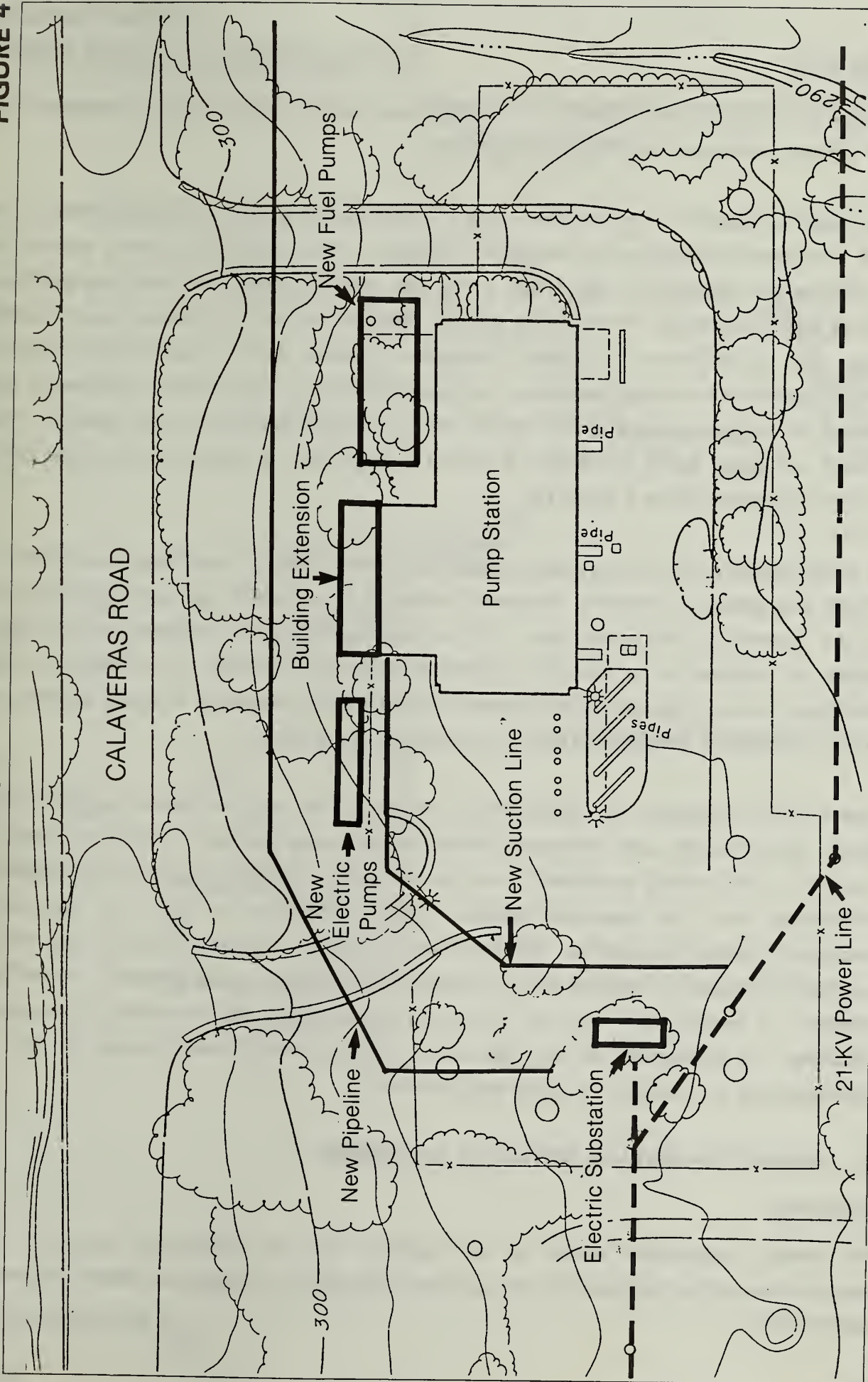
Construction staging and equipment storage areas would be located in flat open spaces along the alignment. Although crew size would be determined by the contractor, it is estimated that 15 construction workers would be employed on this component of the project.

Improvements to Calaveras Reservoir Outlet Facilities

The outdated and deteriorating outlet facilities of Calaveras Dam would also be replaced as a part of this project. These facilities are housed in a concrete tower that extends into the reservoir. Controlled releases from the reservoir are made through one of four valves located at different elevations on the tower. In order to be compatible with the capacity

PLAN VIEW OF SAN ANTONIO PUMP STATION

FIGURE 4



SOURCE: UTILITIES ENGINEERING BUREAU

of the new pipeline, the capacity of the Calaveras outlet works would be increased from 75 million gallons per day (MGD) to 160 MGD.

Although no exterior work would be done to the concrete outlet tower and tunnel, all of the components housed within would be replaced. This includes the outlet valves, the standpipe and pipeline, the electrical wiring and control system, and the steel platform, stairs and handrailing. The existing 44-inch pipeline housed in an outlet tunnel leading from the outlet tower to pipeline would be replaced with a new 66-inch pipeline. Modifications to the outlet tunnel are not planned; however, as with other portions of pipe placed in existing tunnels, grout sealant may be placed around the new pipeline. The tunnel and outlet tower are shown in Figure 5 (page 23). A cross section of the outlet tower is shown in Figure 6 (page 25).

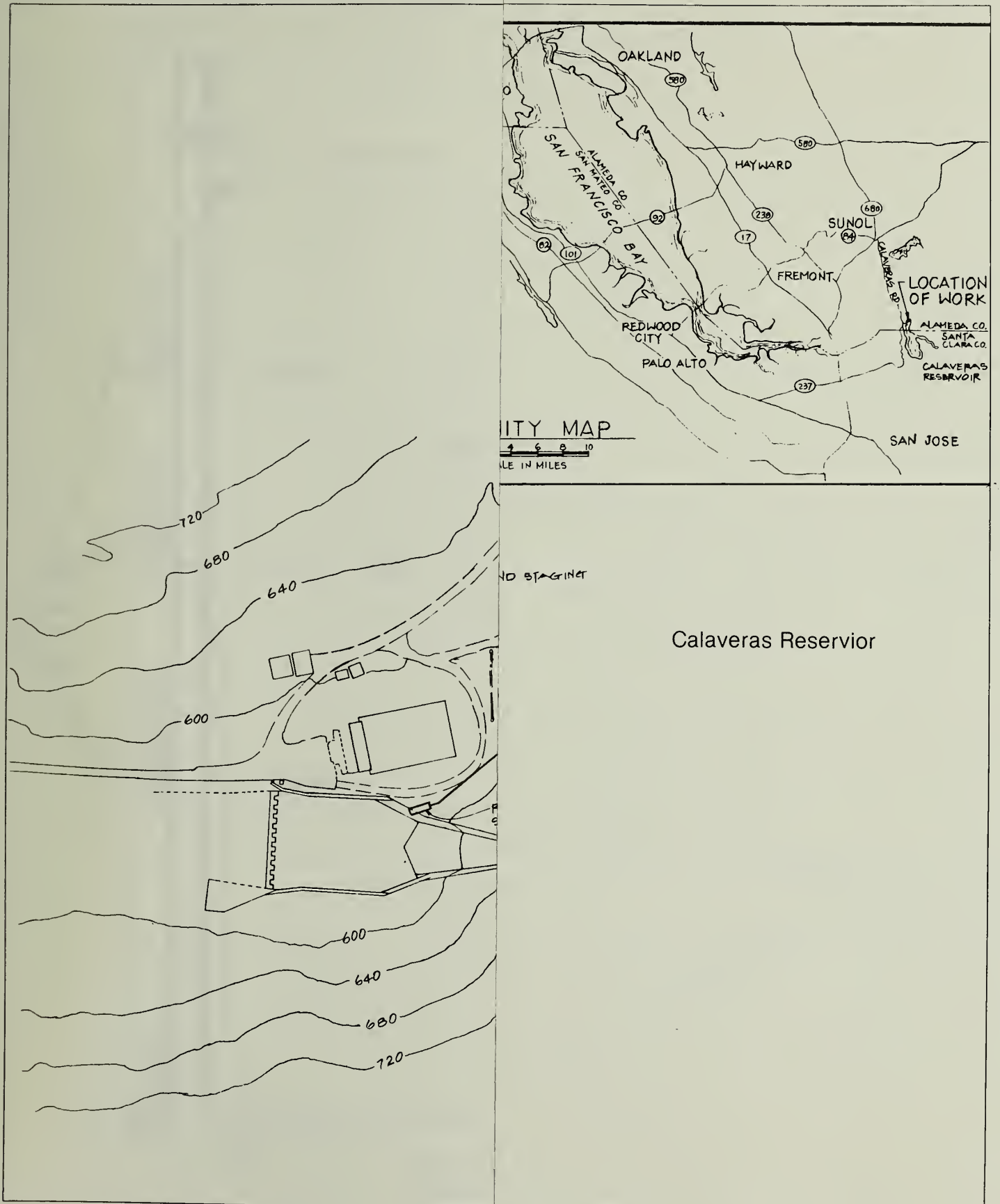
A study required by the Division of Safety of Dams (DSOD) (California Department of Water Resources) is currently underway to see if it is feasible to increase further the outlet capacity at Calaveras Dam. If it is feasible, DSOD could require that the outlet works be upgraded to a capacity as high as 670 MGD in order to provide for rapid discharge in an emergency. If such modification becomes necessary, it would become part of this project but would not affect the impacts of the project.

Construction equipment for improvements to the outlet facilities would include a large crane, large forklift, and temporary trailer; earthmoving equipment would not likely be required. The existing equipment would be removed from the site, and new equipment compatible with the expanded capacity would be trucked to the site, and stored temporarily before installation. The flat area at the top of the dam would be used for the staging and equipment storage area. Construction activities would generally be confined indoors. A construction crew of 15 or less is estimated for the work at the outlet facilities. Replacement of the pipe in the outlet tunnel would involve a crew of approximately ten welders and other steel workers.

D. PROJECT APPROVALS, SCHEDULE AND COSTS

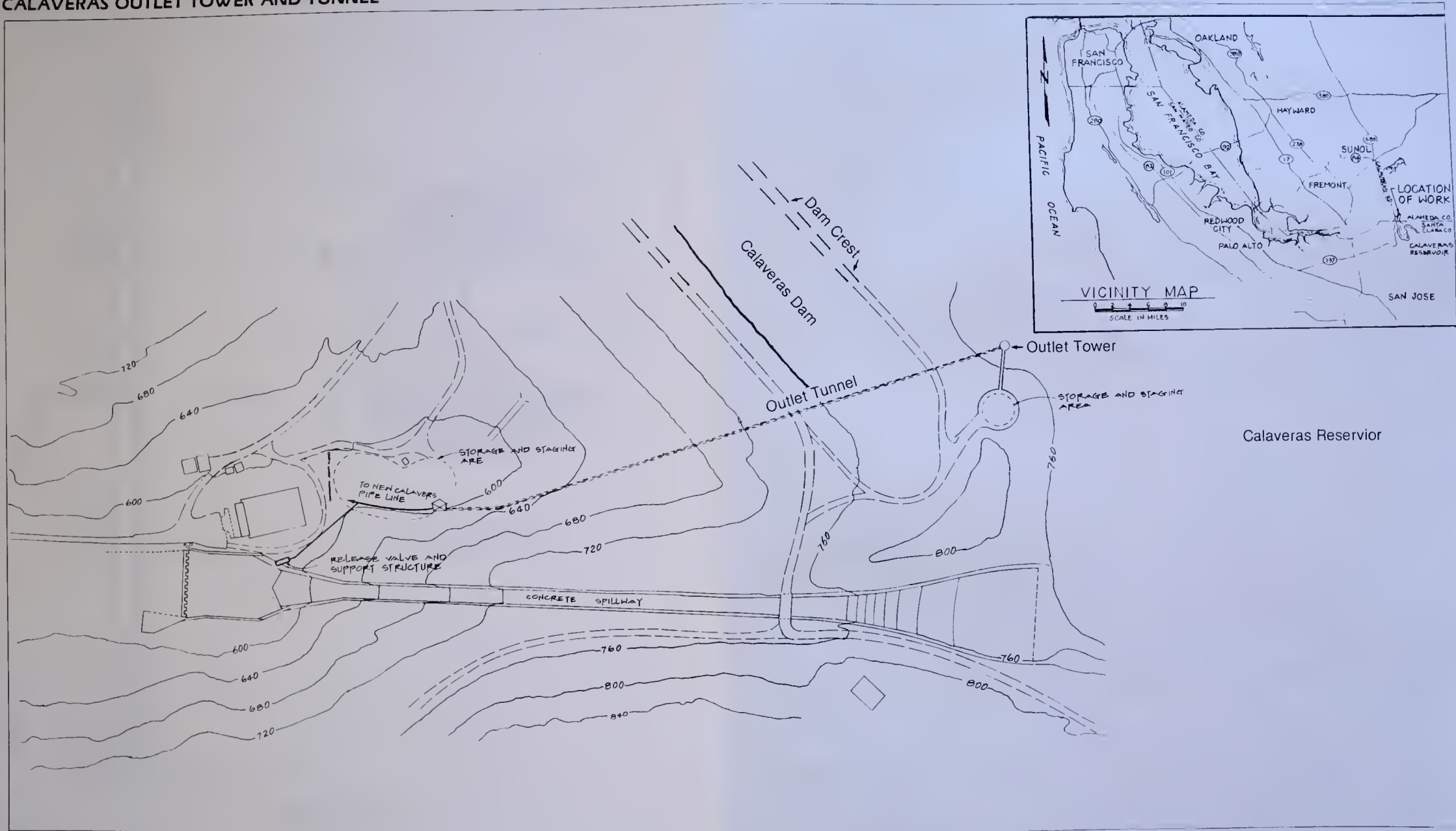
Approvals

The Water Department would be the applicant for all operational permits. The construction contractor would be the applicant and holder of all permits related to project construction.



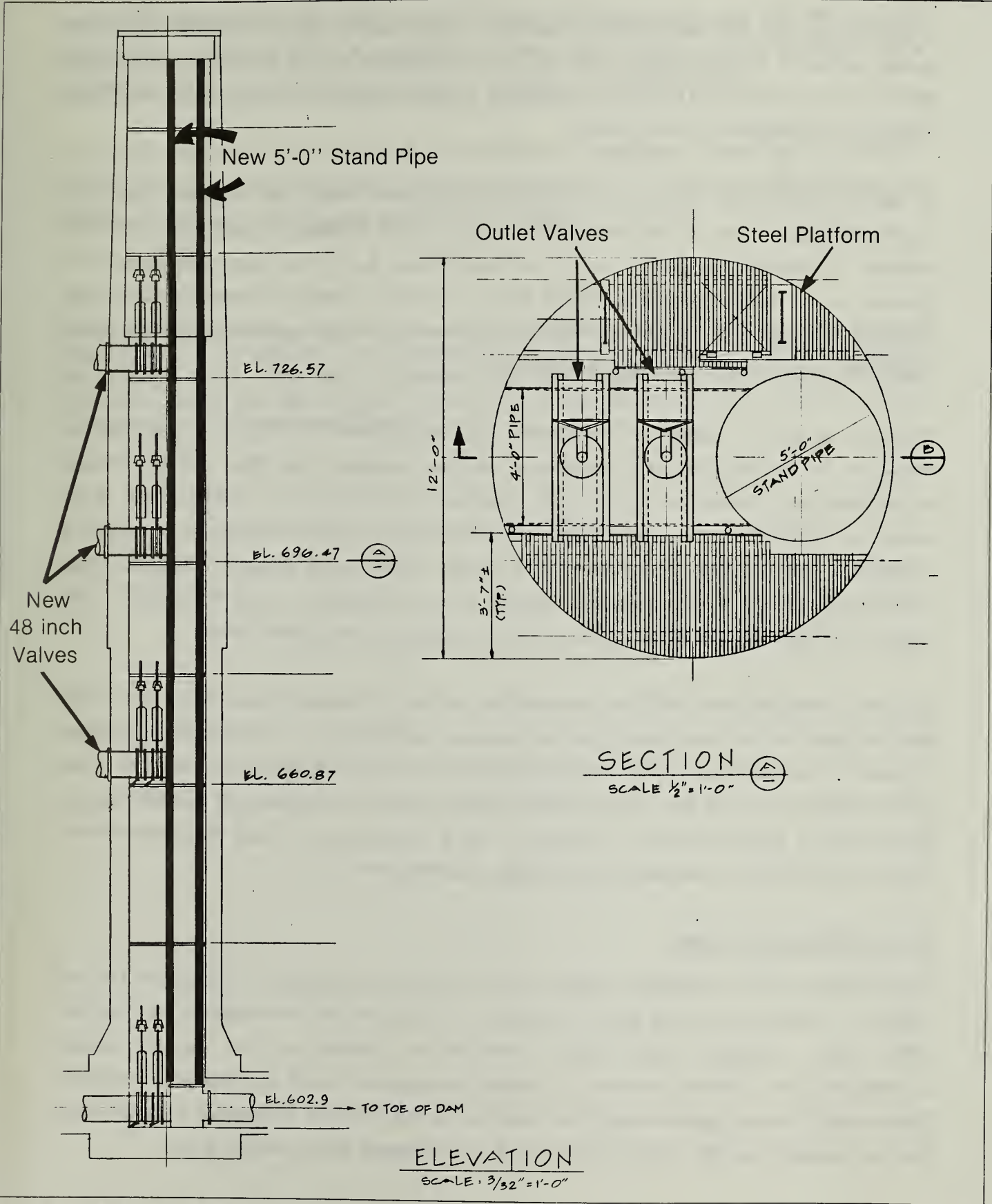
CALAVERAS OUTLET TOWER AND TUNNEL

FIGURE 5



CROSS-SECTION OF OUTLET TOWER

FIGURE 6



SOURCE: UTILITIES ENGINEERING BUREAU

Depending on the size and weight of equipment and trucks moved into and out of the project area, an Overdimensional Permit may be required by the Department of Public Works in the County of Alameda for transport on unincorporated County roads, and from Caltrans for transport on State roads.

A Section 1601/1603 Streambed Alteration Agreement would be required from the California Department of Fish and Game for the stream crossing excavations which are planned. A Section 404 permit under the Clean Water Act, which regulates disposal of dredged or fill materials into navigable waters, would be required from the U.S. Army Corps of Engineers. Certification from the California State Water Quality Control Board would also be required under the Corps permit.

Following a public hearing on this Draft EIR before the City Planning Commission, responses to written and oral comments will be prepared; this EIR will be revised accordingly and presented to the City Planning Commission for certification as to accuracy, objectivity and completeness. No permits may be issued before the Final EIR is certified. The Planning Commission of Alameda County must approve a General Plan Consistency Report on the proposed project prior to adoption of the Final EIR. This report will verify the project's conformity to all aspects of the General Plan.

East Bay Regional Park staff have stated that the San Francisco Water Department will have to apply to the Park District for an encroachment permit for construction activities in Sunol Wilderness Area. Final EIR certification by the City Planning Commission would also be required before the construction contracts can be advertised and awarded by the San Francisco Public Utilities Commission. As a final action the San Francisco Public Utilities Commission must approve a package to advertise to bid.

Project Schedule and Costs

Construction of the replacement pipeline and the associated projects is planned to take 18 months. Construction would begin in January 1991 and would be completed by June 30, 1992. The contractor would decide construction phasing of the various project components and pipeline segments. Certain constraints would be imposed, however. These would include requirements that construction within Sunol Wilderness Area occur in July and August, and that construction within the creekbed occur when it is dry.

Conceptual engineering and detail design for the pipeline replacement are estimated at \$2.8 million. Construction is projected to cost \$23 million. With inclusion of a contingency budget, the total project cost is estimated to be \$27 million.

The improvements to the San Antonio Pump Station -- including engineering, construction and contingency -- would be approximately \$4.1 million. The total cost of replacing the Calaveras Reservoir outlet works would be \$3.2 million.

¹ Resource Conservation and Recovery Act (RCRA), Title 40, Code of Federal Regulations, Parts 280-281; and Underground Storage of Hazardous Substances (Health and Safety Code), Title 23, California Code of Regulations, Section 2610 et. seq. (administered by the State Water Resources Control Board and the Alameda County Department of Environmental Health).

III. ENVIRONMENTAL SETTING

A. WILDLIFE AND BIOLOGICAL RESOURCES

INTRODUCTION

The existing and proposed pipeline routes were surveyed by biologists with EIP Associates in June and November, 1989. The existing pipeline route is evident in the field due to above-ground structures (e.g., valves, exposed pipe, survey stakes) every few hundred feet, and the absence of any mature trees or dense brush in straight swaths between existing structures. Where the proposed route deviates from the existing route, it was either identified by survey lathes or with the assistance of the project engineer.

Plant and wildlife species observed during the field surveys were identified with standard field manuals; the extent and condition of natural communities were noted.¹ Since the field surveys were conducted during the summer and winter, some plants and wildlife species which are seasonally present in the region may not have been evident. Appendix B lists the plant and wildlife species which were observed, or are otherwise known or common to the plant communities present in the project area. Refer to this Appendix for scientific names of species identified by common names in this section.

Prior to the field surveys, a preliminary literature search was conducted by EIP Associates to determine what habitats and rare or endangered species might occur along the route. Resource agencies and organizations were contacted for their input. Information provided by these sources was used to focus the field surveys on areas and issues considered to be most important.

SETTING

The plant communities present along the pipeline route are: annual grassland, oak savannah, riparian woodland, interior scrub, and several areas substantially altered by human activities.

Annual Grassland

The annual grassland consists primarily of annual grasses (e.g., wild oat, annual ryegrass, ripgut brome, and hare barley) and forbs (e.g., thistles, California poppy, lupine, mustard, and filaree). Coyote bush and poison oak are occasional shrubs.

Many of the plants which make up this type of grassland are annual species which were introduced from the Mediterranean as European settlers brought cattle and agriculture to California. Since the native perennial bunch grasses provide the only green foliage in the grassland during California's summer dry season, they have been selectively overgrazed and therefore are no longer dominant as they were in pre-settlement days.

With the exception of the central recreational area in the Sunol Regional Wilderness, all of the annual grasslands in the project area are grazed by cattle. Grassland/pastures on the proposed route are concentrated in Sunol Regional Wilderness near the ranger residence and corrals, in the vicinity of the Geary Road-Calaveras Road intersection, and along the western side of Calaveras Road between the pump station and nurseries. In the grassland areas south of the pump station, there are several mature coast live and valley oaks. Small tributary creeks and drainageways which cross through the annual grasslands are discussed under the riparian woodland section below.

The featureless grazed grassland offers little in the way of roosting or nesting habitat for wildlife, but provides foraging ground for a large number of bird species. In the fall and winter, lark sparrow, white-crowned sparrow, and brown towhee gather seeds and insects there. In spring, the insects of the grassland attract savannah sparrows. Brewer's blackbird and western bluebird are resident birds. Birds commonly breeding in grasslands are the ground-nesting western meadowlarks and horned larks.²

Burrowing rodents such as California ground squirrels and pocket gophers inhabit the shallow soils of the region, and the annual grasses offer some cover for deer mice and voles. The avian predators - northern harriers, red-tail hawks, kestrels, and golden eagles - soar over the grassland in search of these small mammals. Rattlesnakes, racers and gopher snakes similarly prey on rodents found in the grassland habitat.

Oak Savannah

Oak savannah in the project area consists of an annual grassland understory with a discontinuous overstory of coast live, interior live, and valley oaks. Coyote bush, poison oak shrubs, and blackberry brambles are likewise widely spread. Since oak savannah is frequently encountered upland of the floodplain terraces of Alameda Creek, much of the pipeline route is covered by this type of plant community. The pipeline route east of Alameda Creek between the Sunol Regional Wilderness and Welch Road is predominantly oak savannah which is used as cattle pasture.

Under Holland's detailed classification system of California natural communities, the annual grassland and oak savannah would fall under the Valley and Foothill Grassland category.³

The trees in the oak savannah add an additional component of wildlife to that found in the grasslands by providing perching and nesting surfaces. Birds commonly inhabiting the evergreen and deciduous trees of oak savannahs are great-horned owl, mourning dove, California quail, olive-sided flycatcher, downy woodpecker, western wood-pewee, and chestnut-backed chickadee. Oak savannah also provides important habitat for the larger birds of prey such as golden eagle, Cooper's hawk, red-tailed hawk and American kestrel. Acorns are a food source for mule deer, deer mice, dusky-footed wood rat, opossum, scrub jay and acorn woodpecker.

Riparian Woodland

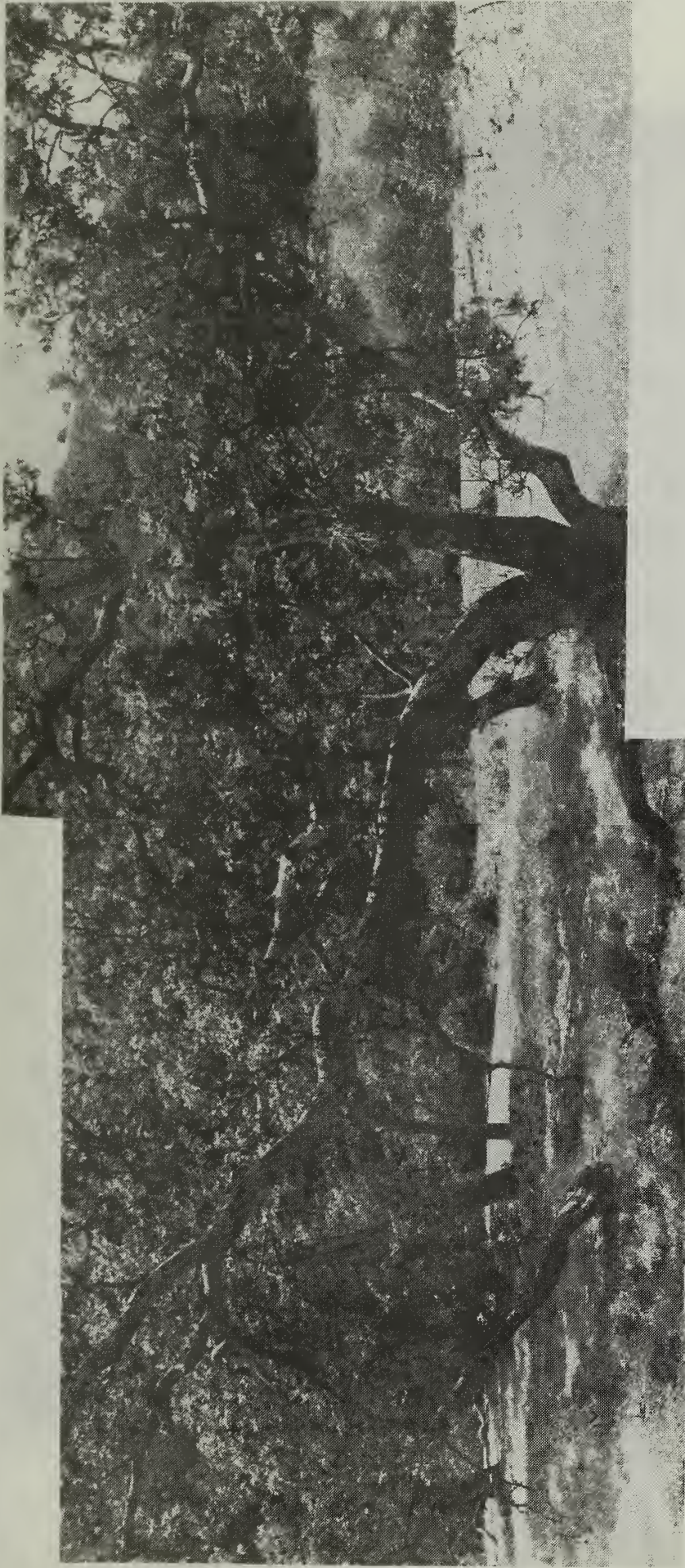
Riparian woodland occurs in narrow bands to each side of Calaveras and Alameda Creeks. The availability of water along these drainage courses encourages the growth of evergreen and deciduous trees such as willows, big-leaf maple, blue elderberry, western sycamore, and live oaks. In the pastureland between Welch Road and Sunol Regional Wilderness,

Alameda Creek is characterized by an open woodland, with large sycamore trees spaced widely apart (see Figure 7, page 33). Where grazing is restricted (in the steep upper watershed of Calaveras Creek, in the central recreational area of Sunol Regional Wilderness, and along Welch Road), a dense understory of California blackberry, honeysuckle, and stinging nettle is present. The overstory is more varied in ungrazed areas, with white alder and California bay. Near bridges and curves in the streams, emergent vegetation occurs – cattail, umbrella sedge, horsetail, willow herb and cinquefoil sticky (see Figure 8, page 34).

Upstream from the confluence with Alameda Creek, the riparian vegetation along Calaveras Creek becomes more dense and varied, and the streambed is choked with large boulders (from the former quarry operation on surrounding cliffs) and plant debris. As shown in Figure 9 (page 35), this portion of the creek has a lush herb layer, streamside shrubbery, and tree foliage at all levels. The boulders, dead branches on the ground, and quiet side pools provide a wide range of habitats for plant and animal species. The habitat in this section of Calaveras Creek supports the greatest density and diversity of wildlife in the project area.

Alameda and Calaveras Creeks are perennial; however, during the dry months of summer, the streamflow is not evident as it flows through underground alluvial deposits. In the upstream reaches of Calaveras and Alameda Creeks, the creekbeds are lined with gravel. Instead of following a straight course, the channels meander in a curved fashion between their banks or break up into several braided pathways between gravel bars.

The existing and proposed pipeline routes are crossed by numerous tributaries of Calaveras and Alameda Creeks. Most of these are ephemeral creeks which have developed as drainageways between topographic highpoints of the surrounding hills. Since their only water source is rainfall, they carry no flow during the summer dry season. The seasonal water is enough to encourage the growth of wetland and sometimes riparian type vegetation as described for the creeks above. The larger ephemeral creeks flow for several months of the year and have a dense tree and brush cover. Smaller ephemeral creeks are essentially erosion scars which flow for only a short period after each rainfall, and are bare or vegetated with low wetland plants and species from the surrounding grasslands. Within Sunol Regional Wilderness, Leyden and Indian Joe Creeks flow year round (except during dry years) due to the input of upstream springs.



Grazed Riparian Woodland Along Alameda Creek near Geary Road.



Emergent Vegetation in Alameda Creek near vehicle bridge in Sunol Regional Wilderness.



Riparian Woodland on Calaveras Creek downstream of tunnel section of pipeline.

Historical grazing may be another factor influencing the size and type of vegetation along these drainageways. Most of the drainageways which are transversely crossed by the pipeline are the smaller variety with grassy or no vegetation.

Riparian woodland supports the greatest density and variety of wildlife species in the project area since food, shade, water and dense cover make the creekside habitats attractive to a wide array of wildlife. For Alameda and Calaveras Creeks, these favorable attributes generally increase upstream; therefore, the more southerly sections of these creeks in the project area have a greater wildlife value.

Trees in riparian woodlands typically support nesting species such as sharp-shinned hawk, northern pygmy and western screech owls, downy and Nuttall's woodpeckers, and yellow warbler. Where there is dense riparian understory, rufous-sided and brown towhees, Bewick's wren, and California quail can usually be found. In fall and spring, migrant warblers and flycatchers would utilize food and cover in the dense riparian vegetation. Opossum, striped skunk, gray fox and long-tailed weasel often use creekside vegetation for cover and foraging. Small mammals such as woodrat and harvest mouse are also likely inhabitants. Bullfrog, Pacific tree frog, and western aquatic garter snake often utilize channels and ponds. The gravel beds and plant debris choking the uppermost reaches of Calaveras Creek create plentiful niches for insects, amphibians and small fish. Raccoon, black phoebe, hermit thrush, fox sparrow, and salmonoid fish were observed along Calaveras Creek during field surveys.

Under Holland's classification system, these riparian woodlands belong to either the Central Coast Live Oak Riparian Forest category or the Sycamore Alluvial Woodland category.

Riparian woodland is a native plant community of limited extent in California. The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) therefore consider it to be of significance and carefully review any projects proposed within this plant community. Due to its location on the west side of the Diablo Range, somewhat arid environments are generally encountered in the project area. The presence of a perennial water source and streamside vegetation is therefore comparatively important.

Alameda and Calaveras Creeks are known to support rainbow trout, California roach, and Sacramento squawfish in the vicinity of the project area.⁴ The rainbow trout population in Alameda and Calaveras Creeks and in Calaveras Reservoir are alleged to be descendants of a former steelhead population which has been cut off from its former migration route by the Calaveras Dam and inadequate spring flow. Rainbow trout and steelhead trout are the same fish species but have slightly different morphological features due to their different life cycles. The rainbow trout in Alameda-Calaveras watershed are of a larger size than usual, indicating a recent derivation from steelhead stock.⁵

Alameda Creek may have formerly supported spawning runs of steelhead trout. Steelhead trout are anadromous fish, that is, as adults they migrate from the ocean to freshwater streams where they spawn and deposit eggs in stream gravels. The young fish remain in the stream environment for one to two years and then migrate downstream to the ocean to spend their adult life.

Critical factors in supporting anadromous fisheries are adequate streamflow and spawning substrate. Adequate freshwater flow is needed in the winter to allow the upstream migration of spawning adults, and in the spring to allow downstream out-migration of the young fish. Pools of water must be available year-round somewhere in the stream corridor to support the juvenile fish during their freshwater phase. A proper gravel substrate is necessary in the stream bottom to allow development of the newly spawned eggs.

Groundwater pumping in Livermore Valley, diversion of streamflow in Sunol by the Spring Valley Water Company, and construction of the Calaveras Reservoir reduced flows in Alameda Creek in the early 1900's so that the steelhead fishery declined. Additionally, water is diverted from upper Alameda Creek for storage in the Calaveras Reservoir. By the late 1950's this watershed did not support a viable steelhead fishery. As a result, subsequent water supply and flood control projects were permitted on the stream without provisions for minimum flows for anadromous fish.⁶

Reestablishment of steelhead in Alameda Creek is currently being considered by CDFG and other public agencies. Major obstacles to reestablishing the fishery are 1) a structure

near the stream's confluence with the bay which prevents upstream migration, 2) inadequate streamflow during the spring, and 3) impacts to quarry operations downstream. Five miles of Alameda Creek in the vicinity of Sunol Regional Wilderness have been identified as suitable for rearing juvenile fish if the steelhead fishery is successfully reestablished.⁷ If such a project is undertaken, it would not commence until after 1991.⁸

Interior Scrub

Approximately 1,200 feet of the pipeline route is characterized by steep rock cliffsides. The vegetation in this area is limited to species such as California sagebrush, sticky monkeyflower, buckwheat, and dudleya which can survive in infertile dry substrate. The interior scrub intergrades into sparse digger pine-blue oak woodland on higher slopes (see upper portion of Figure 8, page 34). It is found along the pipeline route south of the large corral in Sunol Regional Wilderness, and on the east bank of Alameda Creek north of the entrance to the wilderness.

Under Holland's classification system, Diablan Sage Scrub would be the closest category in which to place this interior scrub community, although chamise is not present in the scrub along the pipeline route.⁹

Birds typically found in such rocky brush are wrentit, California thrasher, canyon and Bewick's wrens, scrub jay, domestic pigeon ash-throated flycatcher and sparrow. Mammals typically associated with this habitat include black-tailed jackrabbit, pinon mouse and spotted skunk. Coast horned lizard, common kingsnake and western rattlesnake are found in these dry rocky spaces as are tarantulas.

Downstream of the pipeline's tunnel, the north bank of Calaveras Creek is characterized by sheer rock cliffs due to past quarry operations. These cliffs present another type of rocky terrain which is sparsely vegetated by poison oak, coyote bush, and tree tobacco. Large blocks of rock have tumbled down to the foot of the cliffs where they create numerous shallow caves and tunnels. Bobcat and gray fox may bed down or prowl in these areas. Northern rough-winged swallow and white-throated swifts were observed flying around the upper levels of the cliffs and may be nesting there. Big brown bats and California myotis (a bat) may roost in the cliff crevices at the quarry, and in the tunnel section of the pipeline.

Disturbed Areas

Portions of the route have been significantly altered from their natural state by human activities. The Calaveras Dam flooded 1,500 acres of the watersheds of Calaveras and Arroyo Hondo Creeks. Maximum water depths in the reservoir are approximately 150 feet near the dam. The southern end is shallower with very gradual slope. Aquatic vegetation is sparse along the reservoir's sides due to the steep rocky substrate and fluctuation of the water level. Tules occasionally take root but these are grazed down by cattle and drowned out once the water level rises again.

The reservoir contains the following freshwater fish: largemouth bass, bluegill, Sacramento perch, Sacramento sucker, channel and blue catfish, brown bullhead, sturgeon, and prickly sculpin.¹⁰ Any of the reservoir fish which spawn probably do so in the upstream reaches of Calaveras and Arroyo Hondo Creeks where shallow, vegetated channel bottoms are available. Rainbow trout are known to reproduce successfully in the tributary streams of the reservoir.¹¹

Recreational fishing is not allowed in the reservoir. As an isolated aquatic environment within the Pacific Flyway, it attracts resident and migratory birds such as double-crested cormorant, American coot, great blue heron, and various grebes, geese, ducks, shore birds and gulls.¹² Barn owl and cliff swallow were observed in the dam and control tower structures at the outlet end of the reservoir during winter field surveys.

In Sunol Regional Wilderness, a central area is developed for outdoor recreational use with roads, parking lots, buildings, corrals, and picnic facilities. Western yellow pines have been planted along the driveway to the ranger residence.

Much of the pipeline route from Welch Road to the pump station is occupied by nurseries where landscape trees and shrubs are cultivated in containers on the terraces east of the Alameda Creek floodplain. Some large native oaks and sycamores remain within the nursery grounds, and it is likely that these large trees provide nesting habitat for birds which forage among the landscape plants.

The grounds around the San Antonio Pump Station have been landscaped. The side of the pump station facing Calaveras Road has been planted with Aleppo pine, oleander,

chamise, manzanita, toyon and cypress. This landscaping vegetation provides minimal habitat and food for wildlife.

Species of Special Concern

Prior to the field survey, a literature search was conducted to determine the rare, threatened and endangered species which might occur in the project area. The California Natural Diversity Data Base was reviewed for sightings of special plant and wildlife species in the nine 7.5-minute quadrangles around the project area, and this information was refined with geographic distribution and habitat information provided in floristic and wildlife manuals.¹³ Local experts were consulted, including naturalists at Sunol Regional Wilderness.

All special status flora and fauna species which could be reasonably expected to occur in the region are listed in Table 1. Of these species, the project area possibly provides suitable habitat for Alameda whipsnake, black swift, tri-colored blackbird, black shouldered kite, and red-legged frog, and foothill yellow-legged frogs and steelhead trout.

During the June and November 1989 field surveys, none of these species were observed along the proposed pipeline route or in the general vicinity. Since some of these species have seasonal distribution, it is possible that they occur in the project area but were not evident at the time of the field survey. No trapping efforts were made to confirm the presence or absence of these species.

The Alameda whipsnake occurs in the valleys, foothills, and low mountains of the Coast Range east of San Francisco Bay and west of the Central Valley in Alameda and Contra Costa counties. The project area is at the extreme southern end of its known range. A recent live-trapping study conducted in the hills east of Berkeley found the Alameda whipsnake in habitat with the following common characteristics: 1) a dominance of coastal scrub vegetation usually intergraded with oak or riparian vegetation; 2) a generally southern exposure on steep slopes; 3) the availability of large numbers of prey species (particularly western fence lizard); and 4) a nearby water source.¹⁴

There are two locations in the project area which may provide marginal habitat for Alameda whipsnakes as described above. They are the interior scrub on the south and southwest facing slopes along the existing pipeline route south of the large corral in Sunol

TABLE 1
SPECIAL STATUS SPECIES
KNOWN TO OCCUR IN THE PROJECT REGION

<u>Taxa</u>	<u>Status¹</u>	<u>Notes</u>
<u>PLANTS</u>		
Valley oak <u>Quercus lobata</u>	-/-/4	Occurs occasionally in annual grassland and oak savannah along project route. Two valley oaks south of the pump station will be removed during construction.
<u>ANIMALS</u>		
Black swift <u>Cypseloides niger</u>	CSC/-/-	At inland sites, usually around cliffs near waterfalls. Breeding season is June through August. Has been observed in Sunol Regional Wilderness. Project site does not include waterfalls.
Black shouldered kite <u>Elanus caeruleus</u>	CFP/-/-	Most often seen hunting in agricultural areas where prey is most abundant. Nests in coyote bush, willow, sycamore and eucalyptus trees in riparian habitat as early as February. Although project site provides suitable nesting area, it does not occur near suitable agricultural hunting grounds.
Tricolored blackbird <u>Agelaius phoeniceus</u>	-/C2/-	Nests in fresh water marshes from mid-April to late July in dense colonies. As a permanent resident, occasionally seen in Sunol Regional Wilderness. Creeks in the project area may provide suitable nesting habitat.
Bald eagle <u>Haliaeetus leucophalus</u>	E,CFP/FE/-	Found around coastal and inland waterbodies. Nests in large old growth trees or snags, usually near a permanent water source from February to July. Known to occur at Calaveras Reservoir.

Table 1 (continued)

<u>Taxa</u>	<u>Status¹</u>	<u>Notes</u>
Golden eagle <u>Aquila chrysaetos</u>	CSC,CFP/-/-	Forages over open terrain. Nests on cliffs or tall trees from early February to mid-May. Known to occur at Calaveras Reservoir. Active nest above Calaveras Creek downstream of tunnel.
Aleutian Canada goose <u>Branta canadensis leucopareia</u>	-/FE/-	In California, winters near lakes and reservoirs, primarily in Central Valley. May occur with other Canada geese subspecies at Calaveras Reservoir.
American white pelican <u>Pelecanus erythrorhynchos</u>	CSC/-/-	Winter migrant to San Francisco Bay and large inland lakes. Circulate between Calaveras and San Antonio Reservoirs.
Prairie falcon <u>Falco mexicanus</u>	CSC/-/-	Forage in open terrain. Nest on cliffs mid-February to mid-September. Active nests above Calaveras Creek downstream of tunnel.
Alameda whipsnake <u>Masticophis lateralis euryxanthus</u>	T/C2/-	Scrubland near water in Alameda and Contra Costa Counties. Interior scrub above Alameda Creek may provide suitable habitat.
Red-legged frog <u>Rana aurora draytoni</u>	CSC/C2/-	Quiet permanent pools such as those in Calaveras Creek. Observations of red-legged frog have been recorded in Sunol Regional Wilderness near Little Yosemite (Alameda Creek upstream from project site).
Foothill yellow-legged frog <u>Rana boyleyi</u>	CSC/-/-	Rocky streams with pools and shallows such as those in Calaveras Creek.
Tarantula hawk wasp <u>Pepsis spp.</u>	-/-/-	Dry foothills of the Central Valley. Scrub areas above Alameda Creek provide suitable habitat. Reported at Sunol Regional Wilderness.

Table 1 (continued)

<u>Taxa</u>	<u>Status¹</u>	<u>Notes</u>
Monarch butterfly <u>Danaus plexippus</u>	-/-/-	Yearround or winter migrant in California. Winter locations at selected warm locations along the coast. Reported at Sunol Regional Wilderness.
Steelhead <u>Salmo gairdneri gairdneri</u>	-/-/-	Believed to have spawned in Alameda Creek including in project area. Viable anadromous fishery no longer present in creek. Rainbow trout form of steelhead are currently present in Alameda Creek and Calaveras Reservoir.

¹State/Federal/Other status as follows:

State: under California Endangered Species Act (1984), and Native Plant Protection Act (1977). R = Rare; T = Threatened; E = Endangered; CSC = Species of Special Concern (CA Dept. of Fish and Game); CFP = California Fully Protected (CA Fish and Game Code)

Federal: under Federal Endangered Species Act of 1973, as amended. FE = Endangered; FT = Threatened; C1, C2 = Candidate taxa

Other: Ranking by California Native Plant Society. List 4 = Plant of limited distribution (a watch list).

Sources:

California Department of Fish and Game, California Natural Diversity Data Base, nine quadrangle area, December 28, 1989.

Smith, James P., Jr., and Ken Berg, eds., Inventory of Rare and Endangered Vascular Plants of California, California Native Plant Society, Sacramento, CA, 1988.

California Wildlife and Fish Relationships System Species Notes.

Sunol Regional Wilderness Staff, Birds of Sunol Regional Wilderness and Ohlone Regional Wilderness, Field Checklist and Census Sheet, June 1987.

Sunol Regional Wilderness Staff, East Bay Regional Park District - Sunol Regional Wilderness - Data for Red-legged Frog and Tarantula Hawk Wasp.

Table 1 (continued)

Stebbins, Robert C., California Amphibians and Reptiles, University of California Press, Berkeley, CA, 1972.

Alameda Creek Technical Advisory Committee, Establishment of a Steelhead Fishery in Alameda Creek, May 1989.

Powell, Jerry A., and Charles L. Hogue, California Insects, University of California Press, Berkeley, CA, 1979.

Garth, John S., and J. W. Tilden, California Butterflies, University of California Press, Berkeley, CA, 1986.

Williams, Daniel F., Mammalian Species of Special Concern in California, California Department of Fish and Game, Sacramento, CA, June 1986.

Kuhn, Orville, Watershed Keeper, Calaveras Reservoir, telephone conversation, December 26, 1989.

Ed Stewart, Coordinator of Watershed Keepers, San Francisco Water Department, personal communication, December 22, 1989.

Hans J. Peeters, professor, Chabot College, telephone conversation, December 22, 1989.

Tom Lindemeyer, Environmental Specialist, East Bay Regional Parks District, written communication, February 7, 1990.

Santa Clara Valley Audubon Society, San Jose Christmas Bird Counts, Section C, 1979 through 1989.

Regional Wilderness, and on the east bank of Alameda Creek north of the entrance to the wilderness. These habitats are considered marginal because the scrub vegetation is sparse and lower than three feet in height. The Alameda whipsnake was found in dense scrub vegetation which was generally six feet in height in the above-mentioned study.

When black swifts are found inland from the coast, it is usually around cliffs behind or adjacent to waterfalls in deep canyons. Nests of mud and plant material are made in crevices or under overhangs associated with cliffs. Their breeding season is June through August.¹⁵ Black swifts have been observed in Sunol Regional Wilderness during the nesting season. The quarry area above Calaveras Creek contains cliffs; however, it is not associated with any waterfalls and is very arid. Spillover from the Calaveras Dam is very rare; thus, this concrete structure is not expected to provide suitable habitat either.

Tri-colored blackbirds prefer fresh water marshes with heavy growths of cattails and tules, but will nest in marsh areas with willows, thistles, mustard, blackberry, saltcedar and wild rose.¹⁶ Nest sites are selected in the vicinity of agricultural fields and grasslands for foraging. The project site includes suitable habitat where there are marsh areas with emergent vegetation along Alameda Creek such as near the SVWTP and in the central recreational area of Sunol Regional Wilderness. Most tri-colored blackbird breeding colonies are in the San Joaquin and Sacramento Valleys. However, a colony was observed along Alameda Creek at Interstate 680 during the 1971 nesting season.¹⁷ Nesting generally occurs in May and early June.

Black shouldered kites prefer to prey on small mammals and insects in open agricultural land, but will also forage in grasslands, riparian habitat, and wetlands. They nest in oak woodlands or trees along marsh edges in California. Peak nesting activity is March through May.¹⁸ Grassland areas of the pipeline route provide marginal foraging habitat, riparian habitat may provide suitable nesting areas.

Red-legged and foothill yellow-legged frogs inhabit quiet permanent pools of streams, marshes and ponds. They both have been reported in ponded areas of Alameda Creek upstream from the project area.¹⁹ The upper reaches of Calaveras Creek near the quarry downstream from the pipeline tunnel contain suitable ponds for these species. A field survey by a qualified wildlife biologist was undertaken along Calaveras Creek on March 2,

1990 to specifically confirm the presence or absence of red-legged and foothill yellow-legged frogs. No adult or tadpole frogs were observed at that time or during the general field surveys conducted in June and November, 1989. Because of the excellent condition of the habitat, an additional field survey will be conducted in late April or early May 1990, and any new information or necessary mitigation measures will be included in the FEIR.

Naturalists for Sunol Regional Wilderness consider the narrow-leaved milkweed a plant species of special concern since it is the host plant of the monarch butterfly and tarantula hawk wasp.²⁰ Neither of these insects is officially listed as endangered or threatened, but they are relatively uncommon, and are of interest to park visitors. The tarantula wasp has a curious life cycle. The adult wasp subdues tarantula spiders with a paralyzing sting, deposits eggs on the spider's abdomen, and buries it in a hole. Larvae wasps hatch underground and feed on the tarantula carcass. As an adult, tarantula wasps feed on milkweed nectar.²¹

Narrow-leaved milkweed is also the larval food plant for monarch butterfly. The life cycle of the monarch is the classical example of butterfly metamorphosis which is taught to school children. Furthermore, because monarch butterflies overwinter in coastal areas of California, there is considerable interest in this butterfly throughout the state.²²

Both the monarch butterfly and the tarantula hawk wasp are occasionally sighted in the Sunol Regional Wilderness. Narrow-leaved milkweed occurs in the upper terraces of the Alameda Creek floodplain near the park headquarters, and was evident during the June field survey along the existing route.²³

Valley oak, which occurs in numerous locations along the route, is a plant of limited distribution in the State. The California Native Plant Society has included it on its "watch" list warranting limited monitoring.²⁴

Sunol Regional Wilderness contains or is suspected to contain several special status plants all of which require serpentine-derived soils.²⁵ Serpentine-derived soils were not evident along the project route during the field survey. Nor are they likely to occur along the project route since serpentine soils are not indicated there by soil maps or geological

reports.²⁶ No special status plants endemic to serpentine soils were found during the field surveys.

The bald eagle, golden eagle, Canada goose and white pelican are special status bird species which fish around Calaveras Reservoir. Golden eagles nest in the woodlands around the reservoir, and one golden eagle was observed during a winter field survey.²⁷ As previously discussed, Alameda Creek may have formerly supported spawning runs of steelhead trout, and the creeks and reservoir within the project area contain rainbow trout which may be descendants of former steelhead population. CDFG has been directed by the State Legislature to restore steelhead fisheries in streams such as Alameda and Calaveras Creeks which formerly supported spawning runs of these fish. According to the Alameda Technical Advisory Committee Report, the State Department of Water Resources has identified Alameda Creek as the top candidate of all urban streams in the State for such restoration.²⁸

¹ Munz, Philip and David Keck, A California Flora and Supplement, University of California Press, Berkeley, CA, 1968.

Crampton, Beecher, Grasses in California, University of California Press, Berkeley, CA, 1974.

Mason, Herbert L., A Flora of the Marshes of California, University of California Press, Berkeley, CA, 1957.

National Geographic Society, Field Guide to the Birds of North America, Washington, D.C., 1987.

Berry, William D., and Elizabeth Berry, Mammals of the San Francisco Bay Region, University of California Press, Berkeley, CA, 1960.

Stebbins, Robert, C., California Amphibians and Reptiles, University of California Press, Berkeley, CA, 1972.

² Sunol Regional Wilderness Staff, Birds of Sunol Regional Wilderness and Ohlone Regional Wilderness, Field Checklist and Census Sheet, June 1987.

³ Holland, Robert F., Preliminary Descriptions of the Terrestrial Natural Communities of California, California Department of Fish and Game, October 1986.

⁴ Lindenmeyer, Tom, Environmental Specialist, East Bay Regional Parks District, written communication, February 7, 1990. Frank Gray, Fisheries Biologist, California Department of Fish and Game, telephone communication, March 7, 1990.

⁵ Ibid.

- ⁶ Alameda Creek Technical Advisory Committee, Establishment of a Steelhead Fishery in Alameda Creek, May 1989.
- ⁷ Ibid.
- ⁸ Peter Alexander, Fisheries Specialist, East Bay Regional Parks District, telephone communication, February 16, 1990.
- ⁹ Sharsmith, Helen, K., Flora of the Mount Hamilton Range of California, California Native Plant Society, Sacramento, CA, 1982.
Holland, 1986.
- ¹⁰ Kuhn, Orville, Watershed Keeper, Calaveras Reservoir, telephone conversation, December 26, 1989.
- ¹¹ Lindenmeyer, 1990.
- ¹² Santa Clara Valley Audubon Society, San Jose Christmas Bird Counts, Section C, 1979 through 1989.
- ¹³ California Department of Fish and Game, California Natural Diversity Data Base, nine quadrangle area, December 28, 1989.

Smith, James P., Jr., and Ken Berg, eds., Inventory of Rare and Endangered Vascular Plants of California, California Native Plant Society, Sacramento, CA, 1988.

Munz and Keck, 1968.

California Wildlife and Fish Habitat Relationships System Species Notes.
- ¹⁴ EIP Associates, Results of a Live-Trapping Survey for the Alameda Whipsnake (Masticophis lateralis euryxanthus) in Buckhorn and Kaiser Canyons, Alameda County, California, April 15 through June 30, 1989, East Bay Municipal Utility District, November 15, 1989.
- ¹⁵ Granholm, S. L., R. Duke, and L.R. Mewaldt, Black Swift Species Notes, California Wildlife and Fish Habitat Relationships System Species Notes, October 16, 1984.
- ¹⁶ Grinnel, J., and A.H. Miller, The Distribution of Birds of California, Cooper Ornithological Club, 1944.
- ¹⁷ Tordoff, Walter II and Daniel F. Williams, San Joaquin Valley Conveyance Project, Presurvey Wildlife Assessment, James M. Montgomery Consulting Engineers, Inc., Walnut Creek, CA, June 15, 1987.

- ¹⁸Faanes, C.A. and R. J. Howard, Habitat Suitability Index Model: Black-shouldered Kite, US Fish and Wildlife Service, Washington, D.C., 1987.
- ¹⁹Southworth, J., and J. Dean, East Bay Regional Park District Resource Inventory -Sunol Regional Wilderness - Red Legged Frog, August 18, 1988 and February 24, 1989.
- ²⁰Dean-Freemire, Joanne, Park Naturalist, Sunol Regional Wilderness, personal communication, June 15, 1989.
- ²¹Powell, Jerry, A., and Charles L. Hogue, California Insects, University of California Press, Berkeley, CA, 1979.
- ²²Garth, John S., and J. W. Tilden, California Butterflies, University of California Press, Berkeley, CA, 1986.
- ²³Dean, J., East Bay Regional Parks District, Resource Inventory - Sunol Regional Wilderness - Narrow Leaf Milkweed, August 18, 1988.
- ²⁴Smith and Berg, 1988.
- ²⁵Lindemeyer, Tom, Environmental Specialist, East Bay Regional Parks District, telephone conversation, May 30, 1989.
- ²⁶Welch, L.E., et al., Soil Survey of the Alameda Area, California, US Department of Agriculture, Soil Conservation Service, March 1966.
AGS, Inc., Geotechnical Survey Report Proposed Calaveras Pipeline, Utilities Engineering Bureau, City & County of San Francisco, July 1989.
- ²⁷Peeters, Hans J., professor, Chabot College, Hayward, telephone conversation, December 22, 1989. Santa Clara Valley Audubon Society, 1979 through 1989.
- ²⁸Alameda Creek Technical Advisory Committee, 1989.

B. CULTURAL RESOURCES

The proposed pipeline replacement would involve excavation and removal of the existing 44-inch pipe to be replaced by a 66-inch pipe. Part of the alignment of the existing (and, therefore, the new replacement) pipeline is within the boundaries of the Sunol Regional Wilderness area and is in close proximity to a recorded archaeology site (CA-Ala-428/H). During the planning process two alignments were considered: the alignment of the existing pipeline and an alternative which passed closer to the archaeological site. This alternative has been dropped in favor of enlarging the present alignment.

Culturally, the pipeline alignment is situated in the traditional territory of the Costanoan people. Comparatively little is known about the Costanoans, so named after the Spanish derivative for "coastal people." The population numbers range up to 10,000 people.¹ By about A.D. 1810, "much of the aboriginal population and most aspects of native culture had completely disappeared in the face of relentless European encroachment and its devastating impacts - disease, warfare, displacement and, the California mission system."²

The term Costanoan implies a linguistic affiliation encompassing seven or eight distinct language branches. These derive from Penutian stock, a theoretical linguistic construct which may have its origins in the northwestern Great Basin. It is presumed that the Penutian people slowly migrated into central California, as early as 2500 B.C. The proposed Calaveras pipeline replacement project is situated near the boundary of two Costanoan groups, to the north the Chochenyo and to the south, the Tamyen.

The Costanoans, sometimes referred to as the Ohlone people, were primary collectors and hunters of fish and game. Of major importance to the aboriginal diet were molluscan resources. Other sources of meat included all manner of land and waterfowl, and terrestrial and sea mammal, both large and small.

As with most aboriginal groups in California, plant foods contributed a large part of the diet. The primary source of plant food was the acorn, ground by stone mortar and pestle to form a mush, gruel, or bread. Additionally all manner of berries were harvested along with the buckeye which yielded an edible nut. Roots, shoots and seed were savored as well as wild vegetables - onion, carrot, dock, and others.

HISTORIC BACKGROUND

Initial contact between the Spanish and the East Bay Costanoans occurred in the Spring of 1772 within the Livermore Valley during Lieutenant Pedro Fages' second expedition. This expedition sought a land route around the San Francisco Bay.

The entrance of the Spanish into the East Bay concluded with the founding of Mission San Jose in 1797. Many of the local tribelets were opposed to the establishment of the new mission. As a result of this process, much of the Costanoan and neighboring tribal populations were decimated from malnutrition, physical abuse, and introduction of European diseases.³ Although, thought to be culturally extinct by some scholars, several multiethnic Costanoan descendant lineages managed to survive into the early twentieth century still speaking at least three distinct languages: Rumsen, Mutsun and Chochenyo. Many of these East Bay Costanoan descendants from the Alisal (Pleasanton), Sunol, and Niles (El Molino) rancherias still live near their ancestral territories.^{4,1}

FIELD STUDY METHODOLOGY

Two large portions of the proposed Calaveras Pipeline Replacement project have been subjected to substantial previous surface disturbance. The first of these areas is near the northern end of the alignment, north of the confluence of Welch and Calaveras Creeks, along the west side of Calaveras Road. This portion of the subject property is currently in use as a nursery and has been subjected to extensive surface grading as well as the importation of gravel which covers the native soils. The second area of disturbance occurs within the southern one-third of the project alignment, in and around the headquarters of the East Bay Regional Park District. Extensive road grading has to some extent altered the natural topography within this portion of the project area and any subsurface cultural resources present in these areas may have been impacted.

Documentary research revealed that only one archaeological site had been previously recorded within the confines of the present project area. Recorded in 1981, CA-Ala-428/H is located under an historic-era barn near the headquarters of the East Bay Regional Park District's Sunol Wilderness Area, and is described as a prehistoric deposit with an historic-period component.⁵ The site was initially described as "a seasonal processing site." The historic barn atop the prehistoric deposit belonged to the Geary

family between 1865 and 1939, and currently functions as a museum operated by the East Bay Regional Park District.

Several subsurface archaeological testing and monitoring programs have been conducted in and around CA-Ala-428/H during the past two years, particularly across the road from the East Bay Regional Park District's headquarters building. Prehistoric midden deposits, extending over a rather extensive area in the vicinity of CA-Ala-428/H, were apparently revealed through these limited subsurface tests.

In November 1989, Archeo-Tec undertook an extensive survey of the CA-Ala-428/H site, in an attempt to determine the extent, nature and temporal context of the archaeological resources previously revealed. The project area has been subjected to at least four different surface and subsurface archaeological investigations during the last four years. Additionally, from the middle to late 1980s, other archaeologists investigated CA-Ala-428/H. They offer various comments regarding the site's areal extent, age and cultural characteristics. The first recording of site CA-Ala-428/H was by Alan Leventhal and Randel Eacret in 1981. The site's horizontal and vertical extent were noted as unknown and, based upon the initial surface reconnaissance, the site was described as a seasonally-occupied processing site.

In June, 1988, Dr. Richard Ambro and Randall Milliken of Holman and Associates conducted archaeological monitoring of a series of mechanically excavated utility trenches in the vicinity of CA-Ala-428/H. The archaeological monitoring program was in part a response to an unsubstantiated rumor that one or more human burials had been previously encountered within the confines of the CA-Ala-428/H during excavation of a series of utility trenches in the 1970s (Peggy Shannon, personal communication, 1989). Upon discovery of what the archaeologists suspected to be a significant, or potentially significant subsurface cultural deposit, the mechanical trenching process was suspended.

However, prior to the cessation of the mechanical trenching, Ambro and Milliken observed a discontinuous scattering of fire-affected rock, chipped stone and groundstone artifacts and soils of apparent anthropic origin. No formal report resulted from the archaeological monitoring program conducted by Holman and Associates; however, Dr. Richard Ambro did submit his handwritten field notes and stratigraphic profile drawings to Ms. Peggy

Shannon of the East Bay Regional Park District. Based upon his observations, Ambro concluded that CA-Ala-428/H did contain subsurface prehistoric/protohistoric deposits of undetermined extent, age and quantity (Richard Ambro, personal communication, February 9, 1990.)

In October, 1988, the staff of Archaeological Resource Service (ARS), under the direction of Ms. Katherine Flynn, conducted a limited program of subsurface testing in and around CA-Ala-428/H. A total of five, controlled 1 x 2 meter test units were excavated during the course of this research, which was abandoned shortly after it was started when it was determined that it lay within a previously disturbed portion of the project area. Units 2-5 were excavated to depths of 100 cm below ground surface.

Archaeological Research Service's limited testing program was designed to provide data concerning the areal extent, temporal relationships and function of any archaeological deposits encountered. Unfortunately, no formal laboratory analysis or interpretation of recovered cultural materials was conducted as part of the Archaeological Resource Service's testing efforts. Nevertheless, while their observations differed in some respects from those made previously by Ambro and Milliken, personnel of ARS, based upon preliminary impressions in the field, deemed CA-Ala-428/H to be, at the least, a potentially significant site.

CA-Ala-428/H was next investigated in April, 1989, when personnel of Ohlone Family Consulting Service (OFCS) conducted additional archaeological investigations at the site. Their research objectives consisted of analyzing and interpreting previously collected cultural materials as well as the excavation and analysis of a single additional 1 x 2 meter test unit.

Before concluding our review of the various programs of previous archaeological research at CA-Ala-428/H, a few specific comments regarding site chronology are in order. The only definitive interpretation of the site's temporal placement is offered by personnel of Ohlone Family Consulting Services. After their analysis of the data, OFCS determined that CA-Ala-428/H should, in all likelihood, be assigned to the Middle Period (pre A.D. 900) of the Central California prehistoric sequence (1989:5-3).

Based upon the findings of the literature search for the Calaveras Pipeline Replacement Project, it is apparent that the present subject area and its immediate surroundings are situated within a zone of potential archaeological sensitivity. Accordingly, an on-site field reconnaissance of the subject area was deemed appropriate. On July 27, 1989, on-site reconnaissance of the proposed Calaveras Pipeline Replacement Project was undertaken. The surface survey was conducted by the staff of Archeo-Tec under the supervision of Dr. Allen G. Pastron. The entire 5.5 mile project alignment was systematically surveyed in an attempt to locate and identify cultural resources. In anticipation of the possibility that the precise route of the proposed pipeline may be subjected to minor changes at some point in the future, the archaeological team surveyed a corridor of 75 feet on either side of the proposed alignment wherever possible. All topographic features or other potential indicators of the presence of archaeological materials were noted and intensively surveyed.

Further investigation was undertaken in December 1989 when the Archeo-Tec team, with the help of the East Bay Regional Park District in determining location, placed 28 manual auger borings, 100 centimeters or more in depth, within and immediately adjacent to CA-Ala-428/H. A substantial number (up to 1/3) of the auger holes were placed proximal to the potential pipeline alignments. Both the existing alignment, which will be the sites of the replacement pipeline and the alternative alignment north of Geary Road, which was rejected in the planning process, were investigated. In addition to the auger borings, five units (1 x 1 meters) were dug to a depth of at least 100 centimeters, or to bedrock (whichever came first). The units were placed in or near known areas of high archaeological sensitivity. The units' placements were also determined by the Archeo-Tec team and the East Bay Regional Park staff.

The site's most recent archaeological field investigation revealed scattered cultural deposits. In general, these deposits are discontinuous and fragmented. Evidence of substantial historic-period disturbance and modification to the original topography of CA-Ala-428/H was noted throughout the site area. It is not presently possible to quantify specific historic-period impacts to cultural deposits at CA-Ala-428/H. However, 20th-century excavation, grading and/or trenching have, in all likelihood, substantially affected the site in various places.

Although, a sparse, discontinuous scattering of cultural deposits were found over a relatively widespread area, the most recent archaeological field investigation did not recover a single diagnostic prehistoric artifact from CA-Ala-428/H. Others, as demonstrated by the teaching museum, have found many artifacts in the general area. Since no diagnostic artifacts have been recovered by the present archaeological testing program at CA-Ala-428/H, no temporal parameters were determined for the site. Nothing was recovered which would suggest any early historic and/or protohistoric chronological associations to an extent which would permit specific historic period quantification.

Additional surface reconnaissance identified a bedrock milling station in the vicinity of the proposed pipeline alignment, approximately one-half mile east of the Sunol Wilderness Headquarters Building. The preliminary investigation suggests that this feature is not associated with subsurface deposits; however, this finding has not been confirmed.

¹Levy, R. Costanoan. In R.F. Heizer, vol., ed., Handbook of North American Indians, Vol. 8: California, p. 485-495. Smithsonian, Washington, D.C.

²Cook, S.F., The Aboriginal Population of Alameda and Contra Costa Counties, California, University of California Anthropological Records 16(4):131-156.

³Ibid.

⁴Much of the information in this section comes from Final Report on the Archaeological Data Recovery Program Within a Portion of Prehistoric Site: CA-Ala-428/H, Sunol Regional Wilderness Alameda County, California, prepared by Alan Levanthal, et al., from the Ohlone Families Consulting Services of San Jose, California, September 1989.

⁵Levanthal, A. and R. Eacret, Site Record form for CA-Ala-428/H. Data on file at the Northwest Information Center, Sonoma State University, Rohnert Park, 1981.

OTHER SOURCES CONSULTED:

Kroeber, A.L., Handbook of the Indians of California, California Book Company, Ltd., Berkeley, California, 1925.

Hoover, Mildred Brooke, Hero Eugene Rensch and Ethel Grace Rensch, Historic Spots in California, 3rd Edition, Revised by William N. Abeloe, Stanford University Press, Stanford, California, 1966.

C. GEOLOGY SEISMICITY AND SOILS

Topography

The pipeline alignment is located on the northern flank of the Diablo Range in the Coast Ranges geomorphic province. This section of the Diablo Range is characterized by a series of northwest-tending ridges and intervening drainages.

As shown in Figure 2 (see page 13), the proposed alignment runs along the stream channel and terraces of the Calaveras/Alameda Creek drainage throughout most of the pipeline's length. Areas where the alignment departs from the floor of the Calaveras/Alameda Creek drainage include the Sunol Water Treatment Plant site; the area immediately north of Sunol Regional Wilderness area headquarters, where the pipeline is aligned along a natural bench and then runs along the flank of a spur ridge; the area immediately north of the confluence of Alameda and Calaveras creeks; and the Calaveras Dam Tunnel.

Elevations along the proposed alignment range from +298 feet mean sea level datum (msl) at the San Antonio Pump Station to +660 feet (msl) at the base of the Calaveras Dam. Slope inclinations on the west side of the Sunol Water Treatment Plant site and in the area south of Camp Ohlone Road and "Highway 1" are less than or equal to 1:1 (ratio of horizontal gain to vertical gain), while inclinations at the creek crossings locally exceed 1:1. The slopes at the Sunol Water Treatment Plant site and at the creek crossings parallel the proposed alignment. The slopes in the area south of Camp Ohlone Road are perpendicular to the alignment.

Geology

As mapped by Dibblee,¹ bedrock in the complexly-folded and faulted Diablo Range includes Tertiary marine and non-marine formations, the Cretaceous Panoche formation, and rocks of the Franciscan complex. Quaternary surficial deposits include stream channel deposits; alluvial deposits, which typically form terraces along the banks of the active stream channel; and landslide deposits. The areal distribution of these materials, as mapped by Dibblee¹ is illustrated in Figure 10. The units are discussed in detail below. Detailed geologic maps of the proposed alignment prepared by AGS, Inc. appear in Appendix C of this EIR.

GEOLOGIC MAP

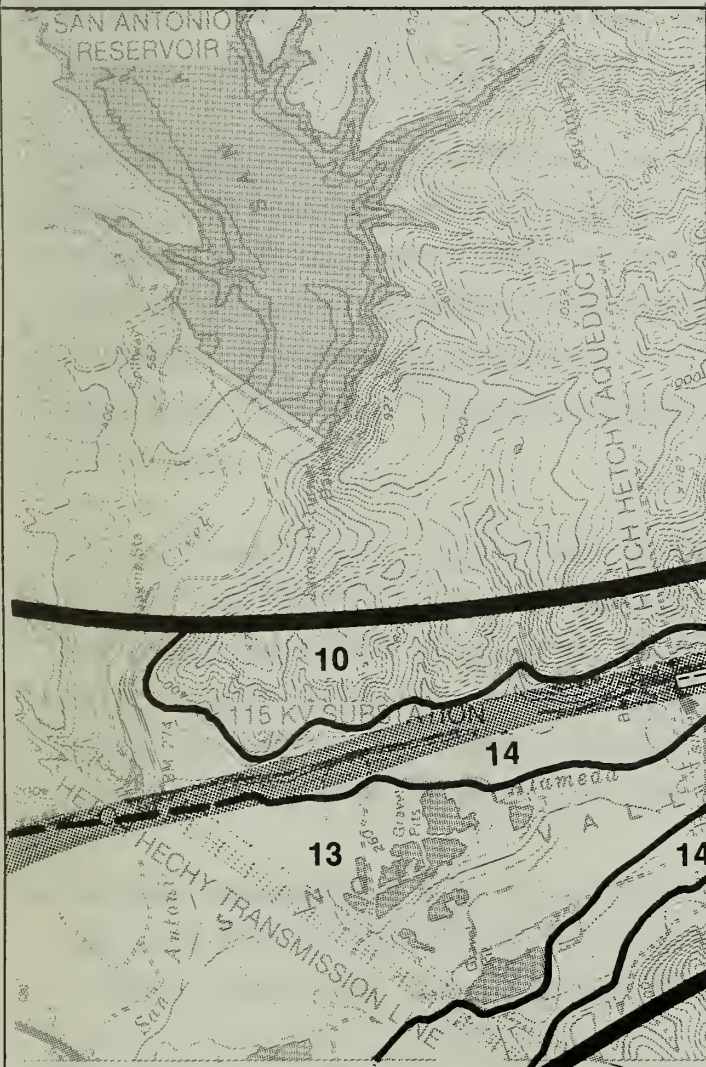
FIGURE 10

MAP MODIFIED FROM: DIBBLEE, 1980, LA COSTA VALLEY QUATERNARY DEPOSITS
DIBBLEE, 1972, CALAVERAS RESERVOIR

- GEOL**
-  Approximate Fault Zone
 - QUATERNARY DEPOSITS
 - 14** Alluvium
 - 13** Stream Channel Gravel and Sand
 - 12** Landslide Debris
 - 11** Older Alluvium
 - 10** Marine Coarse Pebbly Sandstone

GEOL

9
8
7
6
5



SOURCE: EIP ASSOCIATES

FEET 0 2000 4000



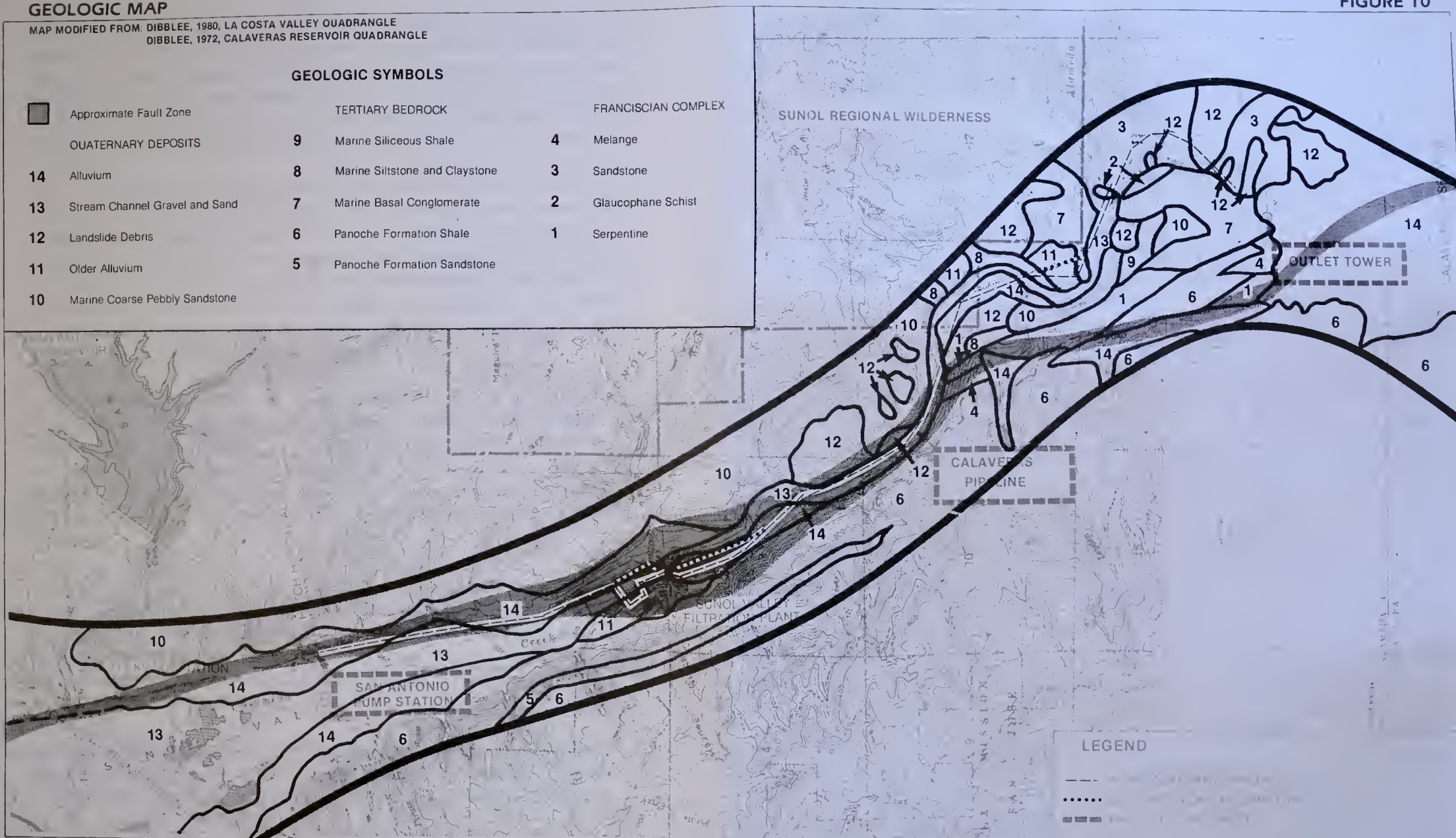
GEOLOGIC MAP

MAP MODIFIED FROM: DIBBLEE, 1980, LA COSTA VALLEY QUADRANGLE
DIBBLEE, 1972, CALAVERAS RESERVOIR QUADRANGLE

FIGURE 10

GEOLOGIC SYMBOLS

	Approximate Fault Zone				
QUATERNARY DEPOSITS					
14	Alluvium	9	Marine Siliceous Shale	4	Melange
13	Stream Channel Gravel and Sand	8	Marine Siltstone and Claystone	3	Sandstone
12	Landslide Debris	7	Marine Basal Conglomerate	2	Glaucophane Schist
11	Older Alluvium	6	Panoche Formation Shale	1	Serpentine
10	Marine Coarse Pebbly Sandstone	5	Panoche Formation Sandstone		



SOURCE: EIP ASSOCIATES

FEET 0 2000 4000



Rocks of the Franciscan complex are present along the eastern side of Calaveras Creek between the Calaveras Dam site and the confluence of Calaveras and Alameda Creeks. These rocks include glaucophane schist, and metamorphic sandstone and basalt, commonly referred to as graywacke and greenstone, respectively. Serpentine, which is commonly associated with the Franciscan complex is present along the Calaveras fault immediately north of the Calaveras Reservoir and was observed locally along the proposed alignment.

The Panoche formation is exposed in the hills along the west side of Alameda Creek between the confluence of Alameda and Calaveras Creeks and the San Antonio Pump Station. Based on mapping by Dibblee,¹ the Panoche formation would not be encountered along the pipeline alignment. However, geologic field investigations conducted by AGS, Inc. show that the proposed alignment will cross Panoche formation in the lower slope above Alameda Creek east of the Sunol Valley Water Treatment Plant. The Panoche shale is exposed along the lower slopes from near the settlement ponds south of the water treatment plant to near the access road northeast of the plant.

Marine sedimentary rocks of Tertiary age are present along the west side of Calaveras Creek to its confluence with Alameda Creek, along both sides of Alameda Creek to the entrances to Sunol Regional park, and along the east side of Alameda Creek from the entrance to the park to the San Antonio pump station. These materials are a combination of poorly- to moderately-consolidated shales and siltstones and moderately-cemented, fossiliferous sandstone.² Most of the landslides encountered along the alignment occur in these units.

Alluvial deposits are present along the bottom of Alameda and Calaveras Creeks. Dibblee¹ separated them into two units: active stream channel deposits, consisting of sand and gravel with cobbles and boulders, and alluvium outside of the active channel. These latter deposits commonly form stream terraces. Particularly coarse deposits are present downstream of the Calaveras Dam Tunnel. The Sunol Valley Water Treatment Plant is located on an elevated terrace of older alluvium.

Landslide deposits have been mapped above portions of Alameda and Calaveras Creeks and above the alluvial terrace at the regional wilderness headquarters area.² The largest of these slides occurs on the east side of Alameda Creek just north of Sunol Regional

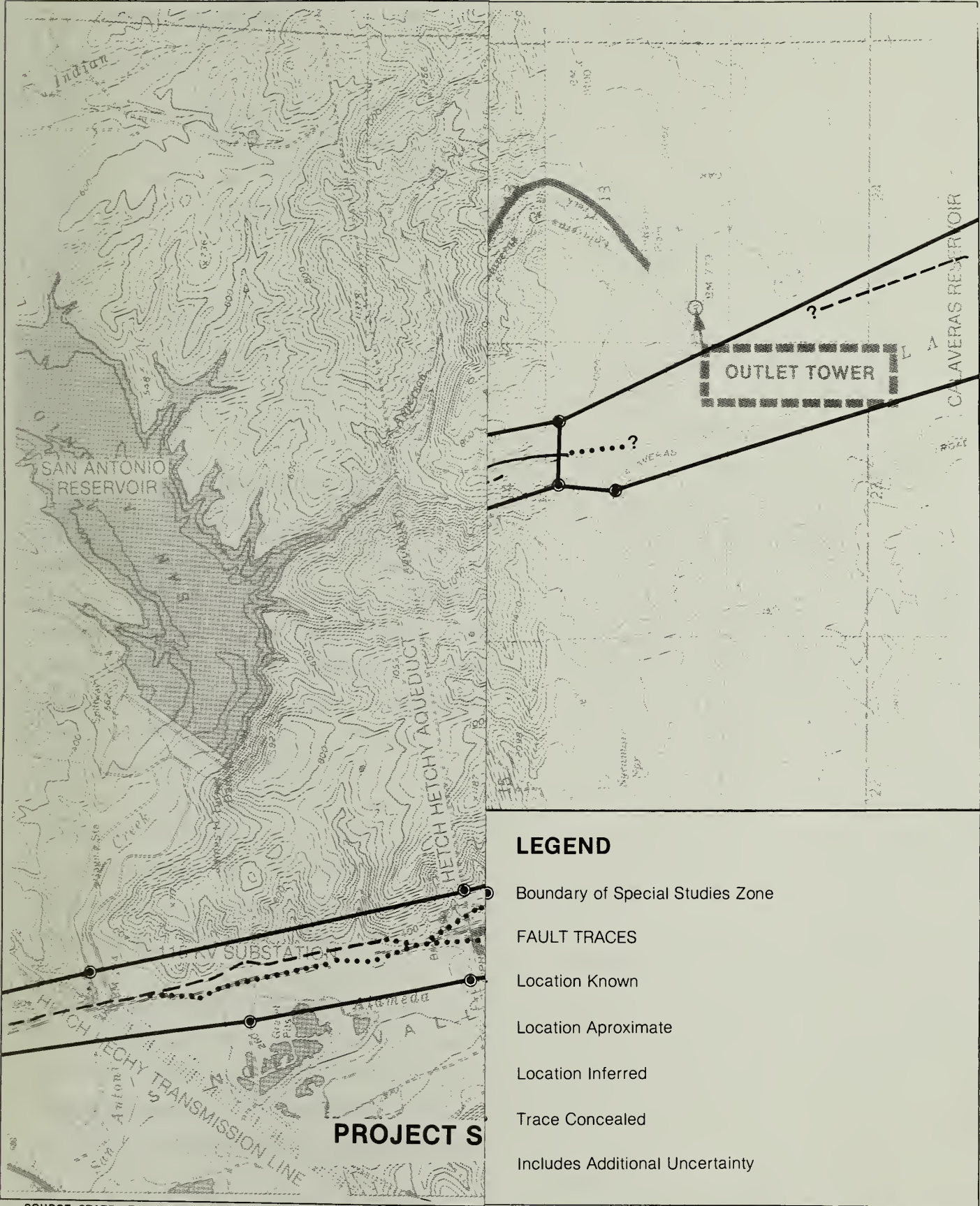
Wilderness Headquarters, about 1,200 feet northeast of the proposed alignment. A reconnaissance of this area suggests that the landslide is quite old. Trees growing on the slide surface show no evidence of recent movement, i.e. they are not tilted, and there are no fresh scarps or other recent landslide features in the slide area. However, there are two recent slope failures along the alignment. The first occurs downstream of the tunnel, where a crib wall was constructed to stabilize the slope. The second is present immediately upstream of the tunnel where fresh scarps are evident on the slope above the pipeline.

The Calaveras fault is the dominant structural feature in the project area. It lies within an Alquist-Priolo Special Studies zone, as shown in Figure 11, which means that it is zoned as active by the State of California's Division of Mines and Geology. The Calaveras fault is capable of generating an earthquake with a magnitude of 7.4 on the Richter Scale, with estimated peak bedrock and ground surface accelerations of 0.1g.² Fault rupture associated with an earthquake of this magnitude would be on the order of one to two feet. As illustrated in Figure 11, the proposed alignment crosses the Calaveras fault in the area immediately north of Sunol Regional Park. It parallels, and may cross, the buried trace of the Calaveras fault several times in the area immediately south of the San Antonio Pump Station. Because the fault trace is buried by recent alluvium in both areas the exact locations of the fault crossings are not well defined.

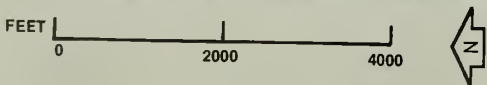
The other major active faults that could cause significant shaking in the project area include the San Andreas, Hayward, Seal Cove - San Gregario and Greenville faults. The Hayward fault, four miles away from the project site, is capable of generating a magnitude 7.4 earthquake with estimated peak bedrock and ground surface accelerations of 0.60g.

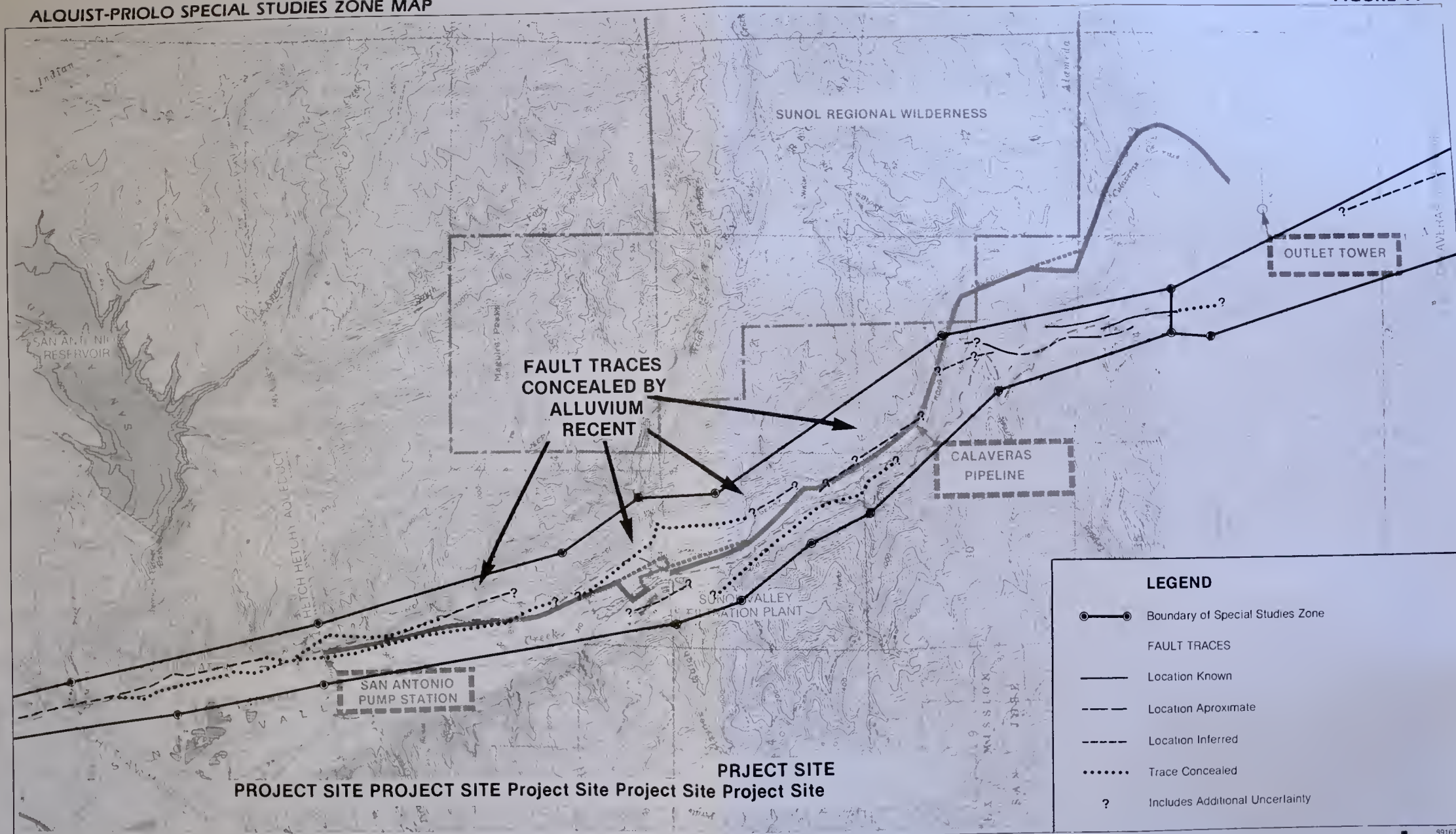
¹ Dibblee, T.W (1980) Preliminary Geologic Map of the La Costa Valley Quadrangle; U.S. Geological Survey Open File Report 80-533A and Dibble, T.W (1972) Preliminary Geologic Map of the Calaveras Reservoir Quadrangle; U.S. Geological Survey Open File Report 73-58.

² AGS, Inc. (1990) Geologic and Geotechnical Study Report, Proposed Calaveras Pipeline; prepared for Utilities Engineering Bureau City and County of San Francisco.



SOURCE: STATE OF CALIFORNIA SPECIAL STUDIES ZONES MAPS FOR CALAVERAS





SOURCE: STATE OF CALIFORNIA SPECIAL STUDIES ZONES MAPS FOR CALAVERAS RESERVOIR (1982) AND LA COSTA VALLEY (1982)



D. VISUAL QUALITY

Introduction

Visual quality is a perception based on the physical features and scenic qualities of a place or an area. In visual quality analysis, the existing visual character of a location and its regional setting are considered. Features such as landform, vegetation, water features, color, light, and cultural modification are inventoried; then, proposed changes are evaluated.

For the proposed Calaveras Pipeline project, a field investigation and photo survey of the project area were conducted on Friday, December 15, 1989. Existing visual conditions of the project corridor, facilities, and region were inventoried. Figure 12 serves as a key to site photos referenced below.

Visual Character of the Project Area

The project area is located in south-central Alameda County, near the Santa Clara County line. This area is within the northern section of the Diablo Range, in the eastern portion of the Coast Ranges physiographic province. A series of northwest-southeast trending ridges characterizes the Diablo Range.¹ Elevations in the project area range from about 300 feet in Sunol Valley to over 2,000 feet in the surrounding hills. Topography of the project area is gentle to rugged in character. From the pipeline terminus to Welch Creek near the Sunol Water Treatment Plant, the terrain is rolling and land relief is low. From the Sunol Water Treatment Plant to the confluence of Alameda and Calaveras Creeks, terrain is more rugged; short, steep slopes occur locally. The steepest slopes, with the greatest relief are in the section of the proposed pipeline corridor that is between the Calaveras Dam and the confluence of Alameda and Calaveras Creeks. Drainages are etched on steep slopes above the valley floor, adding texture to the scene; numerous seasonal and permanent streams drain the valley.

The project region is pastoral in character due to the dominance of grazing lands, open space preserves, and watershed lands (see Figure 13(A)). Development is constrained by landform, water features, and land-use restrictions. Open grassland contrasts with chaparral and oak woodland communities which cover the hills. Oak tree masses occupy north and east facing slopes. Slopes bordering the west side of the valley are more lushly

vegetated than eastern slopes. Human disturbance is evident on the landscape in the form of fencelines, nurseries, roads, utility distribution lines, and a few buildings. The existing trestle crossings are generally not visible from public roads. Nursery operations constitute the majority of existing development in the vicinity of the proposed project. Figure 13(B) illustrates the visual character of the valley as seen from the Sunol Water Treatment Plant; a tree nursery occupies the valley floor.

Views of the project area are screened and shortened by terrain and vegetation. Large Valley Oaks are focal points in the landscape. The greatest number of people view the project area from Sunol Valley along Calaveras Road and Geary Road. Calaveras Road connects with Highway 680 in Sunol and Highway 237, near Milpitas, providing a link through the rural area. Figure 14(A) illustrates the existing visual character of Calaveras Road, near the San Antonio Pump Station. Calaveras Road is also the primary access for the Sunol Regional Wilderness, an East Bay Regional Parks holding. Sections of the proposed project corridor are adjacent to or within the 5,924-acre Sunol preserve (see Figure 14(B)). Trails traverse the Sunol Regional Wilderness offering views of the surrounding hills, canyons, reservoirs and valley. One existing trestle crossing within the park is seen from hiking paths and service roads.

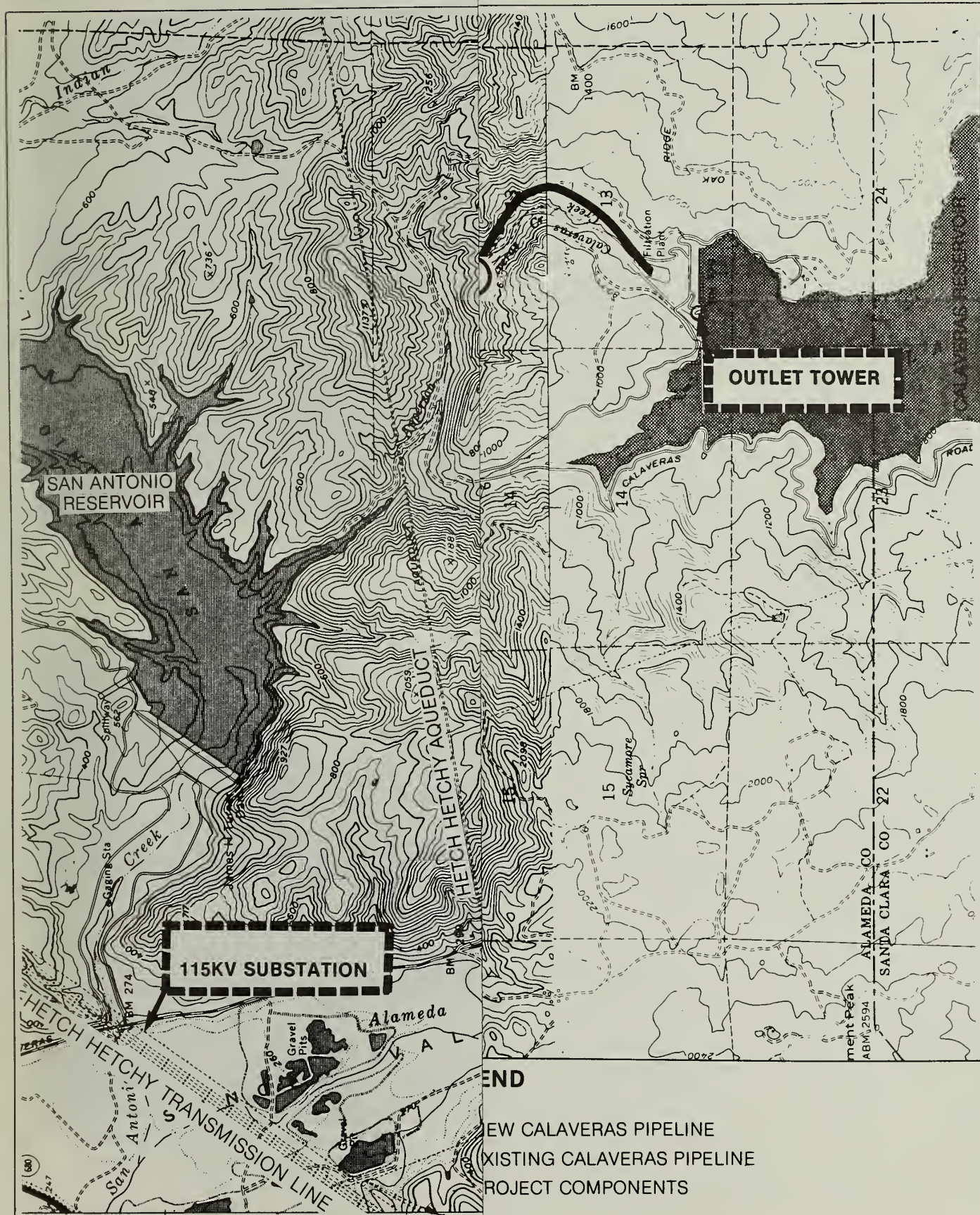
The visual character of existing pipeline trestle sections is illustrated in Figures 15(A) and 15(B). While these structures are generally not visible from public roads and trails, they do result in an unnatural feature on the landscape. The proposed project would remove existing pipeline trestle crossings over streams and bury the pipeline throughout its entire length.

Scenic Roadways in the Study Area

The current Scenic Highways Element (May 1966) of the Alameda County General Plan identifies both Calaveras Road and Geary Road as County-designated Rural-Recreation Scenic Routes.² Both roadways are two-lane and provide access to the Sunol Regional Wilderness.

The County defines Scenic Rural-Recreation Routes as:

"Major rural roads are generally two lane, low traffic volume roads that traverse sparsely populated open agricultural or recreational areas and that often carry traffic to major recreation areas.



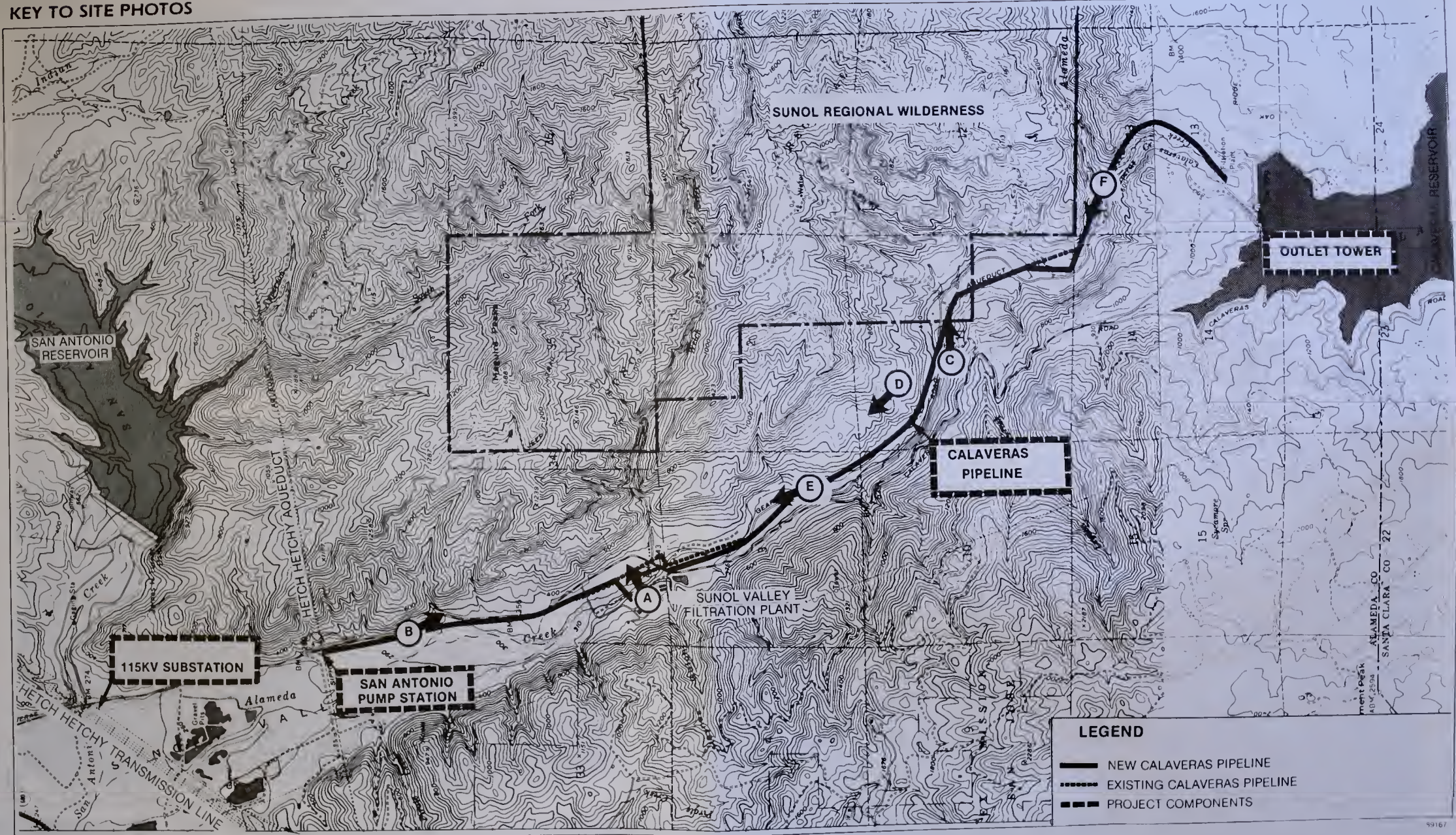
SOURCE: EIP ASSOCIATES

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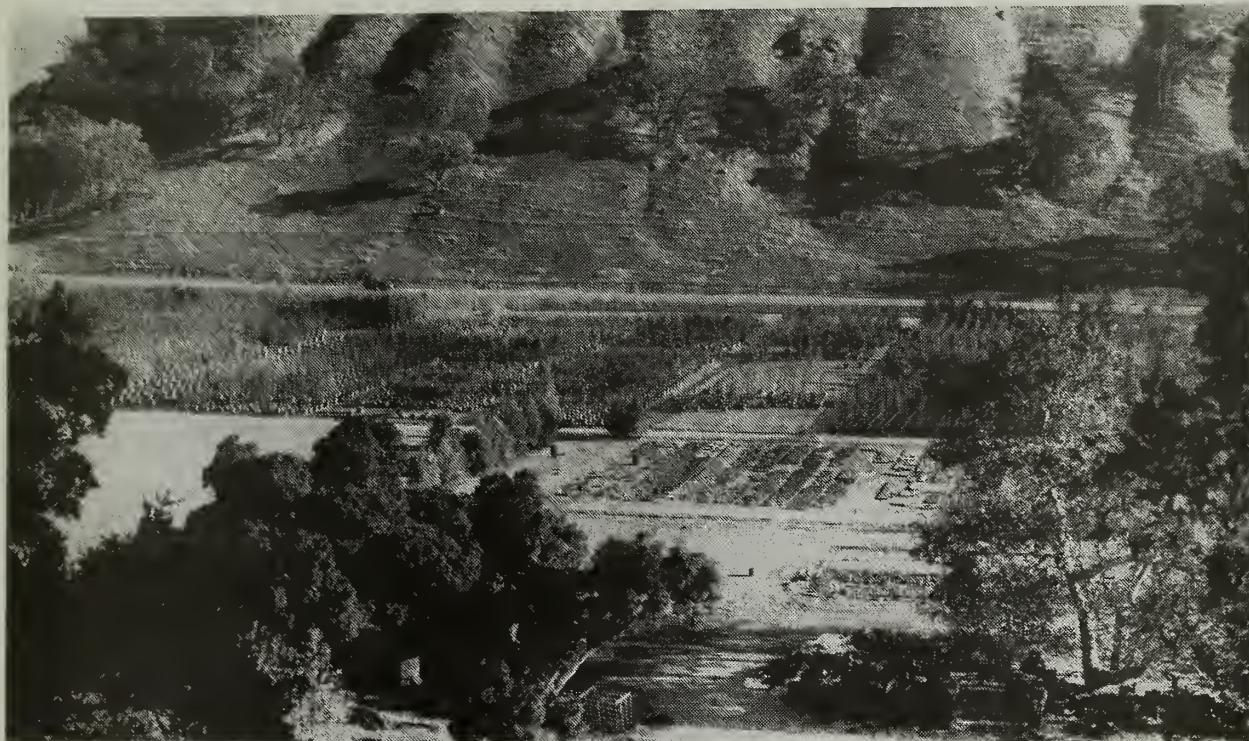
FIGURE 12

KEY TO SITE PHOTOS



SOURCE: EIP ASSOCIATES

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A Sunol Valley as seen from the Sunol Valley Filtration Plant, looking east.



B Calaveras Road is designated as a Scenic Corridor by Alameda County. This photo is taken near the San Antonio Pump Station looking south.

SOURCE: EIP ASSOCIATES

89167

(Note: Refer to Figure 12, Key to Site Photos, for photo location.)



C The proposed pipeline would cross Geary Road and enter the Sunol Regional Wilderness at the park entrance.



D Typical character of the proposed pipeline alignment through grazing land.

SOURCE: EIP ASSOCIATES

89167

(Note: Refer to Figure 12, Key to Site Photos, for photo location.)



E Typical visual character of existing trestle crossing.



F Visual character of existing pipeline.

"Scenic Rural-Recreation Routes are those major rural roads that traverse areas of outstanding scenic quality or that carry traffic to major scenic and recreational areas. Scenic Rural-Recreation Routes in selected areas may be combined with public recreation areas such as parks, parkways, reservoirs, or hiking, riding and cycling trails."

Objectives of the Alameda County Scenic Routes Element which apply to Calaveras Road and Geary Road include:

"To establish a continuous system of routes, that will be convenient to all persons in Alameda County, and that will increase the enjoyment of, and opportunities for, recreational and cultural pursuits and tourism in Alameda County and adjacent counties by providing scenic pleasure drives and scenic routes to all major recreation areas and cultural centers throughout the county and adjacent areas.

"To conserve, enhance, and protect scenic views observable from scenic routes."

Several principles of the County's Scenic Routes Element of the General Plan also apply to the proposed project; they include:

"Underground utility distribution lines when feasible; make overhead lines inconspicuous." New, relocated or existing utility distribution lines should be placed underground whenever feasible. When it is not feasible to place lines underground, they should be located so as to be inconspicuous from the scenic route. Poles of an improved design should be used wherever possible. Combined or adjacent rights-of-way and common poles should be used wherever feasible.

"Establish architectural and site design review." Architectural and site design review by the appropriate local jurisdiction should be provided for each site and for all new or altered structures so that particular consideration will be given to appearances that will enhance scenic qualities from the scenic routes. Originality in landscape and construction design should be encouraged.

"Use landscaping to increase scenic qualities of scenic route corridors." Landscaping should be designed and maintained in scenic route corridors to provide added visual interest, to frame scenic views, and to screen unsightly views.

"Control tree removal. No mature trees should be removed without permission of the local jurisdiction as a means of preserving the scenic quality of the county.

"Control alteration of streambeds and bodies of water. Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only with approval of the local jurisdiction, as a means of preserving the natural scenic quality of stream courses, bodies of water, vegetation and wildlife in the county. Development along edges of streams, canals, reservoirs, and other bodies of water should be designed and treated so as to result in naturalistic, architectural or sculptural forms."

East Bay Regional Parks

As previously noted, the Sunol Regional Wilderness is within the jurisdiction of the East Bay Regional Parks District (EBRPD) system. Policies of the EBRPD, as stated in the current (1988) Master Plan state that:

"All new utility lines will be placed underground within the land areas owned, operated, or managed by the District to retain optimal visual qualities. Rights-of-way and easements will not be granted without undergrounding."³

No new easement would be necessary; the project would use an existing easement.

E. TRANSPORTATION

The proposed 66-inch pipeline would be installed in the proximity of Calaveras Road and Geary Road from the San Antonio Pump Station to Calaveras Reservoir. The pipeline would traverse circulation roads and parking areas of the Sunol Regional Wilderness. Project staging areas, including employee parking, would be along the pipeline alignment.

Calaveras Road is a two-lane roadway approximately 23 feet wide and 21 feet between edgelines (10.5-foot lanes). Edgelines are striped roughly one foot from the edge of pavement. The prima facie speed limit is 25 mph. Observed 85-percentile speeds average 50 mph. This means that 85 percent of the vehicles travelled at 50 mph or less; the other 15 percent exceeded this speed. Traffic counts taken Friday through Sunday, December 15 through 17, 1989, averaged 443 vehicles/day on Calaveras Road, with a maximum of 449 on Sunday.

Geary Road is a narrow two-lane road approximately 19-feet wide with 8.5-foot lanes. Approximately one-half mile west of the entrance to Sunol Wilderness, there is a 0.1 mile-long section of Geary Road that suddenly becomes a single lane 14.5-feet wide (13.8 feet between edgelines); no warning signs are posted. The prima facie speed limit on Geary Road is also 25 mph with an 85-percentile average of 41 mph. Average daily traffic for December 15 through 17, 1989, was 190 vehicles per day with a maximum of 255 on Sunday.

Traffic volumes determined previously by the County of Alameda are shown in Table 2, Existing Traffic Volumes, and traffic volumes and results of speed studies done for this project are shown in Table 3 (page 73) Traffic Counts and 85-Percentile Speed. The location of these counts is shown in Figure 16 (page 75), with the numbers corresponding to the numbered locations shown in Tables 2 and 3. As can be seen in the tables, traffic in the project area is light.

According to East Bay Regional Park District staff, there are 350 primary parking spaces in the Sunol Regional Wilderness Area. An overflow parking lot, which is generally used on weekends between February and June, accomodates an additional 250 cars. Peak park usage occurs in the spring months of April and May. A daily average of 600 vehicles enter

TABLE 2
EXISTING TRAFFIC VOLUMES

<u>Location</u>	<u>Average Daily Traffic</u>	<u>AM Peak Hour Traffic</u>	<u>PM Peak Hour Traffic</u>
1) Calaveras Road at County Line	96	10	16
2) Geary Road	436	44	71
3) Welch Creek Road	110	11	13

Notes:

- 1) The count for Geary Road was taken on a Sunday. Geary Road leads to the Sunol Wilderness headquarters and recreational facilities. The County of Alameda does not have a weekday count for Geary Road.
- 2) The counts for Calaveras Road and Welch Creek Road were taken on a weekday.
- 3) The differences in traffic volumes between Tables 2 and 3 are due to the locations at which the counts were taken and the differing times of the year.

Source: County of Alameda

TABLE 3
TRAFFIC COUNTS AND 85-PERCENTILE SPEED*
FIELD SURVEY: TRAFFIC DATA SERVICE

4) Calaveras Road North of Welch Road

<u>Date</u>	<u>Day</u>	<u>Southbound adt/mph</u>	<u>Peak Hour (am/pm)</u>	<u>Northbound adt/mph</u>	<u>Peak Hour (am/pm)</u>	<u>Total Vehicles adt</u>	<u>Peak Hour (am/pm)</u>
12/15/89	Friday	165/46.62	(17/23)	312/51.14	(14/75)	477	(31/98)
12/16/89	Saturday	207/50.44	(19/34)	195/56.84	(15/32)	402	(34/66)
12/17/89	Sunday	252/50.44	(33/49)	197/46.84	(14/34)	449	(47/73)
Three-Day Average						443	(37/79)
Three-Day Average 85-Percentile Speed: 50.39							

adt - average daily traffic; mph - miles per hour

5) Geary Road East of Calaveras Road

<u>Date</u>	<u>Day</u>	<u>Southbound adt/mph</u>	<u>Peak Hour (am/pm)</u>	<u>Northbound adt/mph</u>	<u>Peak Hour (am/pm)</u>	<u>Total Vehicles adt</u>	<u>Peak Hour (am/pm)</u>
12/15/89	Friday	59/41.26	(15/6)	57/42.12	(8/13)	116	(23/19)
12/16/89	Saturday	100/41.24	(21/19)	100/41.82	(6/22)	200	(27/41)
12/17/89	Sunday	126/40.66	(20/23)	129/40.86	(8/27)	255	(28/50)
Three-Day Average						190	(26/37)

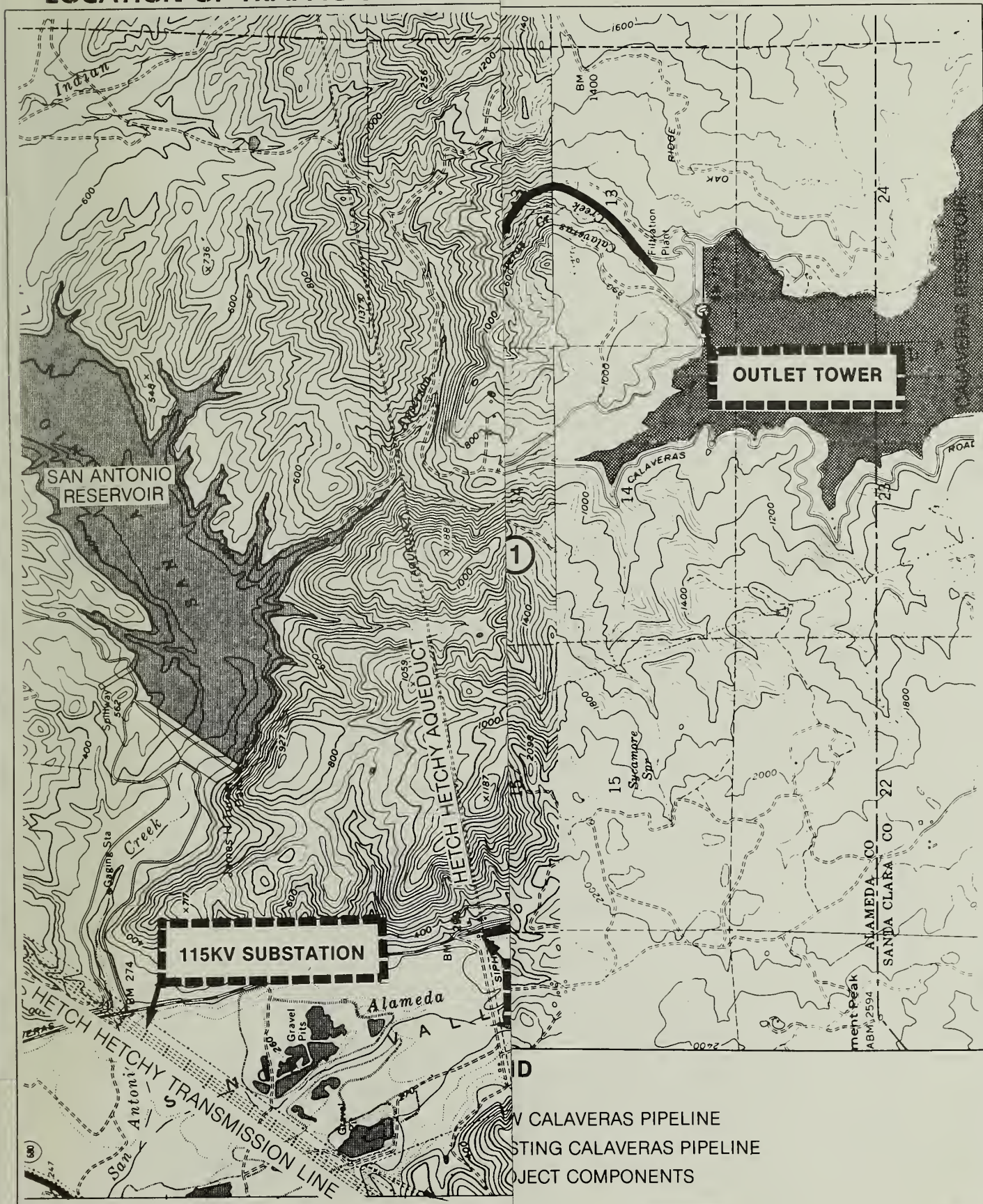
* This is the speed which 85 percent of the cars are not exceeding. It is not the average speed of 85 percent of the cars.

adt = average daily traffic; mph = miles per hour

Source: Traffic Data Service.

LOCATION OF TRAFFIC COUNTS

FIGURE 16



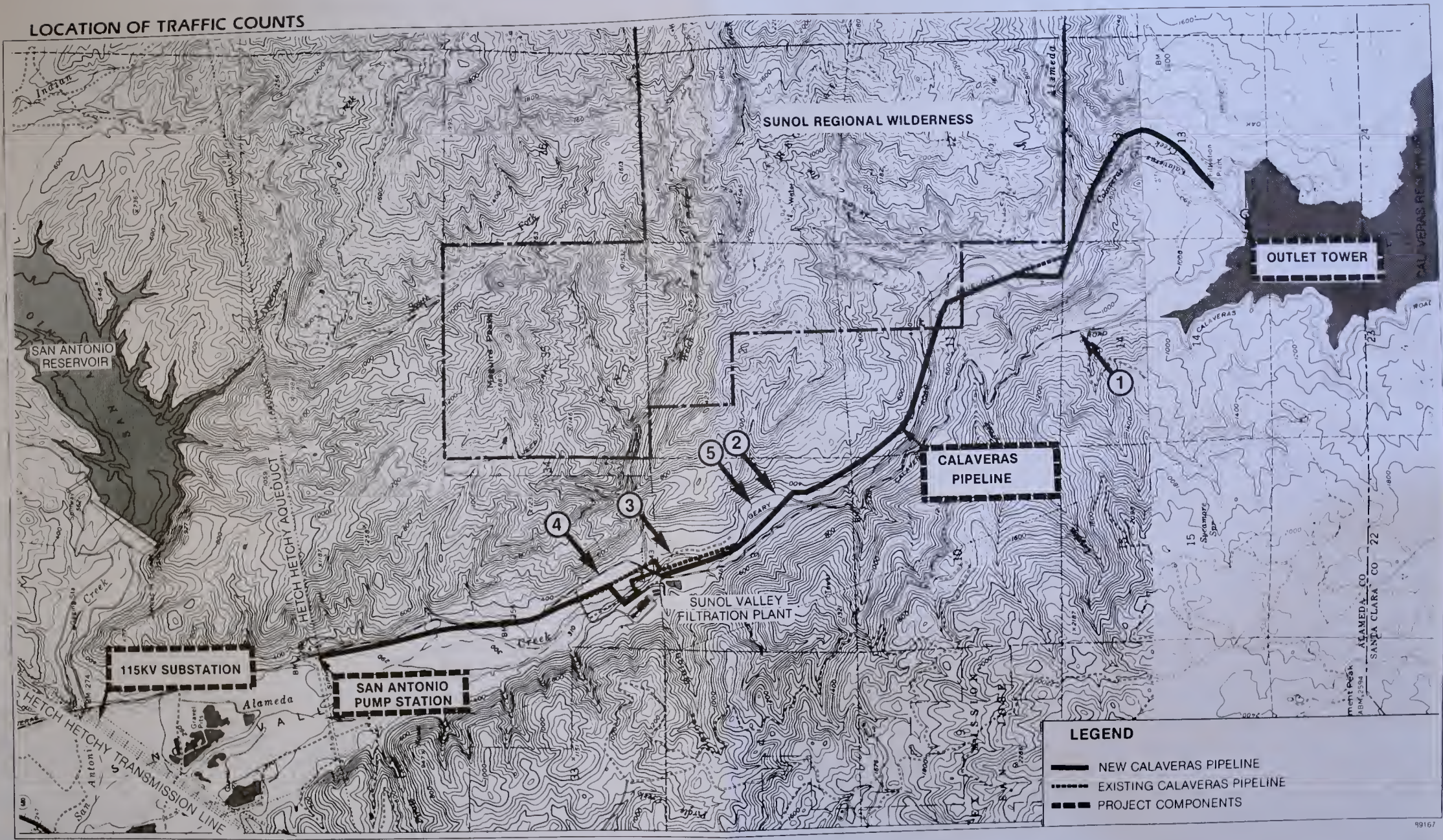
SOURCE: RGM ASSOCIATES

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NEW CALAVERAS PIPELINE
EXISTING CALAVERAS PIPELINE
PROJECT COMPONENTS

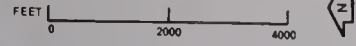
LOCATION OF TRAFFIC COUNTS



LEGEND

- NEW CALAVERAS PIPELINE
- - - EXISTING CALAVERAS PIPELINE
- PROJECT COMPONENTS

SOURCE: RGM ASSOCIATES



the park on weekends in these two months. Traffic into the park is lighter on summer weekends, averaging 200 vehicles per day. During the week, an average of 100 cars per day enter the park in spring months, and 50 cars per day enter in summer months. The park may receive 1,000 vehicles on the peak day of the year.

F. NOISE

The noise environment along the proposed alignment is characterized by rural noises, such as wind, running water and bird calls, punctuated by vehicular traffic and aircraft overflights. Noise levels in rural areas are typically in the range of 30 to 40 dBA¹ with occasional intrusion of car and aircraft noises ranging as high as 70 to 85 dBA, especially along Calaveras and Geary roads.

There are no County noise ordinances applicable to the construction or operation of this project.

There are no residences along the proposed route, nor any other sensitive receptors such as schools, hotels, food service establishments, or hospitals. The Sunol Wilderness Area hosts wildlife and recreational amenities generally sensitive to noise.

¹dBA is a measure of sound in units of decibels (dB). The "A" denotes the A-weighted scale, which simulates the response of the human ear to various frequencies of sound.

G. AIR QUALITY

REGULATORY BACKGROUND

The 1970 Clean Air Act gave the U.S. Environmental Protection Agency (EPA) the authority to set federal ambient air quality standards. The federal standards were designed to protect those people most susceptible to respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by illness, and persons engaged in strenuous work or exercise (all termed "sensitive receptors").

In 1971, the EPA established federal standards for five major air pollutants: photochemical oxidants (ozone), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂) and total suspended particulates (TSP). The TSP standard was changed in July 1987 to apply only to particulate less than 10 microns in diameter, termed PM₁₀. The PM₁₀ standard replaced the TSP standard because it was more easily associated with health impacts resulting from inhalation into the human respiratory tract.

State ambient air quality standards were established in California starting in 1969, pursuant to the Mulford-Carrell Act. The federal and State standards, given in Table 4, provide acceptable durations for specific contaminant levels in order to protect sensitive receptors from adverse effects as indicated in Table 5 (page 81).

The 1977 Clean Air Act Amendments (passed after many states failed to meet the five-year deadline for achieving the federal standards) required that each state identify areas within its borders that did not meet federal primary standards (i.e., non-attainment areas) and devise a State Implementation Plan (SIP), subject to EPA approval, to attain federal primary standards no later than the end of 1987. Now that 1987 has passed and many states, including California, still violate federal standards, the EPA has adopted an interim policy. The EPA's policy would become moot if Congress amends the Clean Air Act to specify a different course of action, but as of the end of 1989 Congress has not been able to reach agreement on such a revision.

In 1988, the California Legislature enacted AB 2595 (Sher), the so-called California Clean Air Act. AB 2595 was signed into law by Governor Deukmejian, and it became effective January 2, 1989. This legislation requires areas of the State which exceed California air quality standards to plan for the eventual attainment of State standards.

TABLE 4
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

<u>Pollutant</u>	<u>Averaging Time</u>	<u>Federal Primary Standard</u>	<u>Federal Secondary Standard</u>	<u>California Standard</u>
Ozone	1-hour	0.12 ppm	0.12 ppm	0.10 ppm
Carbon Monoxide	1-hour	35.0 ppm	35.0 ppm	20.0 ppm
	8-hour	9.0 ppm	9.0 ppm	9.0 ppm
Nitrogen Dioxide	1-hour	---	---	0.25 ppm
	Annual	0.05 ppm	0.05 ppm	---
Sulfur Dioxide	1-hour	---	---	0.5 ppm
	24-hour	0.14 ppm	---	0.05 ppm
	Annual	0.03 ppm	---	---
PM ₁₀	24-hour	150 ug/m ³	150 ug/m ³	50 ug/m ³
	Annual	50 ug/m ³	60 ug/m ³	30 ug/m ³

ppm = parts per million, ug/m³ = micrograms per cubic meter.

Source: Bay Area Air Quality Management District.

TABLE 5
HEALTH EFFECTS SUMMARY OF THE CRITERIA AIR POLLUTANTS

Air Pollutant	Adverse Effects
Ozone	- o eye irritation - o respiratory function impairment
Carbon Monoxide	- o impairment of oxygen transport in the bloodstream, increase of carboxyhemoglobin - o aggravation of cardiovascular disease - o impairment of central nervous system function - o fatigue, headache, confusion, dizziness - o can be fatal in the case of very high concentrations in enclosed places
Sulfur Dioxide	- o aggravation of chronic obstruction lung disease - o increased risk of acute and chronic respiratory illness
Nitrogen Dioxide	o risk of acute and chronic respiratory illness
Total Suspended Particulates (TSP)	- o increased risk of chronic respiratory illness with long exposure - o altered lung function in children - o with SO₂, may produce acute illness
PM ₁₀	o particulate matter 10 microns or less in size (PM₁₀) which may be inhaled, and possibly lodge in and/or irritate the lungs
Lead	- o impairment of blood function and nerve construction - o behavioral and learning problems in children

Source: Bay Area Air Quality Management District.

AIR POLLUTANT PROBLEMS AND TRENDS

Regionally, the most severe and complex air quality problem is the relatively high level of ambient ozone. In contrast to ozone, CO is a sub-regional problem in the Bay Area, because CO is a non-reactive pollutant with one major source, motor vehicles.

Particulate levels in the Bay Area typically show a pattern of low values near the coast. They increase with distance inland and reach their highest levels in dry, sheltered valleys, such as the Santa Clara, Diablo, and Livermore Valleys. The most important man-made sources in the Bay Area are demolition and construction activity, and motor vehicle travel over paved and unpaved roads. The old federal secondary TSP standard is occasionally exceeded in many Bay area communities.

The Bay Area Air Quality Management District (BAAQMD) operates a regional air quality monitoring network in order to gauge the Bay Area's progress toward attainment of federal and State ambient air quality standards. At these monitoring stations readings are taken regularly of the major criteria air pollutants. On the basis of monitoring data from all stations in the Bay Area, the entire Bay Area has been designated a non-attainment area with respect to the federal ozone and CO standards, and Santa Clara County as a non-attainment area with respect to the old federal TSP standard. The Bay Area's current status with respect to the new federal PM10 standard is undetermined.

AIR QUALITY IN THE SOUTH BAY

The project site lies in the southern portion of the air basin formed by the coastal mountain ranges surrounding San Francisco Bay. The predominant wind direction is from the northwest. These prevailing winds transport air pollutants released from upwind urban areas in San Mateo and Alameda Counties. The area's location downwind of urban sources, frequent light winds and high atmospheric stability give the South Bay area a high potential for air pollution.

The BAAQMD operates a network of permanent air quality monitoring sites throughout the Bay Area. The closest comprehensive monitoring sites are located in Fremont on Chapel Way and in San Jose on Fourth Street. A three-year summary of the data collected at these two stations for the criteria pollutants, together with the most

applicable air quality standards, are shown in Table 6. The data in Table 6 show violations of federal and State standards for ozone in the South Bay. Measurements of PM₁₀, taken only at the San Jose station, meet the federal primary ambient air quality standards but exceed the State standards. Because ozone levels are a regional problem, concentrations measured at the monitoring stations are likely to be representative of conditions at the project site. In contrast, levels of pollutants such as CO and PM₁₀ are more sensitive to nearby sources; the monitoring data, therefore, may not adequately represent on-site conditions.

AIR QUALITY PLANNING AND CONTROL IN THE BAY AREA

Planning for the attainment and maintenance of federal and State air quality standards in the Bay Area is the joint responsibility of the BAAQMD, the Association of Bay Area Governments (ABAG), and the Metropolitan Transportation Commission (MTC). To deal with violations of federal CO and ozone standards in the region, the BAAQMD, ABAG, and the MTC authored the 1982 Bay Area Air Quality Plan (AQP). The AQP projected attainment of federal standards for CO and ozone by 1987 and their maintenance below the standards through the year 2000. The AQP proposed no additional measures for particulate control. This problem is difficult to control with currently available methods, and the AQP only recommended further research on the problem.

Monitoring data for 1988 show that occasional violations of the federal ozone and eight-hour CO standards (i.e., 5 days over the standard for ozone, and 4 days over the standard for CO) are still being recorded in the Bay Area. The BAAQMD cannot currently declare regional attainment for ozone or CO.

TABLE 6
AIR POLLUTANT DATA SUMMARY

STATIONS: Fremont (FRMT), San Jose - 4th St. (SJ-4)

<u>Pollutant</u>	<u>1986</u>		<u>1987</u>		<u>1988</u>	
	<u>FRMT</u>	<u>SJ-4</u>	<u>FRMT</u>	<u>SJ-4</u>	<u>FRMT</u>	<u>SJ-4</u>
OZONE (ppm)						
Highest 1-hour	0.14	0.14	0.16	0.14	0.13	0.12
Days > 0.09	3	12	17	23	7	12
CARBON MONOXIDE (ppm)						
Highest 1-hour	10.0	16.0	10.0	12.0	9.0	15.0
Days > 20.0	0	0	0	0	0	0
Highest 8-hour	5.6	11.3	5.0	7.4	9.0	15.0
Days $\geq$ 9.1	0	5	0	0	0	3
NITROGEN DIOXIDE (ppm)						
Highest 1-hour	0.14	0.16	0.15	0.17	0.14	0.16
Days > 0.25	0	0	0	0	0	0
SULFUR DIOXIDE (ppm)						
Highest 24-hour	NM	NM	NM	NM	NM	NM
Days > 0.05	NM	NM	NM	NM	NM	NM
PM10: (ug/m ³)						
Highest 24-hour	NM	122	NM	112	NM	146
Samples > 50	NM	23	NM	22	NM	22
Annual Geometric Mean	MN	42.8	NM	39.2	NM	34.3
Exceeds State Standard	NM	Yes	NM	Yes	NM	Yes

Units - ppm: parts per million; ug/m³: microgram per cubic meter
NM: not monitored

Source: California Air Resources Board, Air Quality Data Summary, 1986-1988.

Note: Highest recorded values for specific averaging times are followed by number of exceedances of the California State standards for each of the criteria pollutants.

H. WATER QUALITY

The proposed project site occupies portions of the Alameda and Calaveras Creek drainages. Alameda Creek originates in the northern Diablo Range and flows westward to its confluence with Calaveras Creek.

Between the Calaveras Reservoir and the San Antonio Pump Station the combined flow of the two creeks drains to the north northwest. Upstream of the confluence of Calaveras and Alameda Creeks, the Alameda Creek drainage basin comprises approximately 37.5 square miles.

In the area of the proposed project alignment, rainfall ranges between 16 and 20 inches during the average year, while rainfall in the northern Diablo Range at the eastern end of the Alameda Creek drainage basin averages more than 30 inches per year.¹ The mean annual basin-wide precipitation for the Alameda Creek basin upstream of its confluence with Calaveras Creek is 28 inches. The average annual runoff is 13,140 acre-feet as measured at the gauging station near the confluence of the two creeks, with a range of from 2,170 acre feet to 32,240 acre feet over a forty-year period.¹

Flow in Calaveras Creek is captured in Calaveras Reservoir. Water is only released to Calaveras Creek below the reservoir during extended wet periods. Releases to the creek have only been made 13 times in the last 50 years. Thus flow in the creek is brief in duration as it is usually fed only by runoff from the limited watershed below the dam and is reduced to ponds between dry stretches of creek bed for much of the year.²

No information on existing water quality of Alameda or Calaveras Creeks in the vicinity of the proposed project appears to be available. If downstream measurements of water quality in the creek are taken as an indicator, then water quality varies greatly with flow. During high flows the total dissolved solids content drops to less than 100 milligrams per liter (mg/l). During low flows it rises to 700 to 900 mg/l.³ No information is available on suspended solids content, but if the affected reaches of Alameda and Calaveras Creeks are typical of other Bay Area streams in undeveloped areas it can be expected that water turbidity is high during and immediately after storms.

¹Rantz, S.E. (1974) Mean annual runoff in the San Francisco Bay region, California, 1930-1970; U.S. Geological Survey, Miscellaneous Field Studies Map MF-613.

²Alameda County Technical Committee, 1989.

³Water Resources Data California, Water Year 1988, USGS Water Data Report CA 88-2.

I. HAZARDS

The Calaveras pipeline is located in a rural area of riparian woodland, oak savannah, annual grassland, and a limited amount of interior scrub. Sunol Wilderness Area lies within the pipeline alignment; this park draws hikers and other recreational visitors, particularly in the spring months and on weekends. The alignment also passes through several nurseries located along Calaveras Road. There are no permanent human residences in the project area, with the exception of the ranger's residence, located in Sunol Wilderness Area. However, the pipeline would cross buried utility lines (water, electric and telephone) which serve 17 residences up Welch Creek Road and the Sunol Regional Wilderness Area Headquarters. Service interruption would effectively deprive them of access to emergency services.

The existing Calaveras pipeline has a single water tap along its length, which is located within Sunol Wilderness Area. This tap has not been maintained by the Water Department and is believed by the Department to be no longer functional. The Water Department maintains that it has no legal obligation to provide water to the park for fire protection purposes. The EBRPD maintains that the SFWD does have a contractual obligation to provide water through this tap for fire protection services. No documentation has been produced to support either view. It is the Lead Agency's position that, without documentation, SFWD has no obligation to provide water to Sunol Wilderness Area for fire protection. In the event of a fire within park boundaries, it would be treated and combatted as any forest fire occurring in a similar rural area.

A forest fire in the vicinity of the pipeline would be combatted by the California Department of Forestry (CDF). For a first-alarm summer afternoon fire, the Department would dispatch a Chief Officer, eight fire engines, two bulldozers, two 15-man hand crews, two fixed-wing, fire-retardant-dropping aircraft, one helicopter with an eight-man fire-fighting crew, and one fixed-wing aircraft for coordination of air activity.¹ Additional equipment and personnel would be dispatched for a second-alarm fire. If the fire occurred within Sunol Wilderness Area boundaries, CDF would battle the fire in coordination with the Park District. The Park District maintains a fire truck at the Sunol headquarters, has two full-time fire fighters, and the park rangers are trained to double as fire fighters.

The Calaveras pipeline currently has five trestled creek crossings which could pose a threat to public safety. The trestles provide an attraction to children and vandals. A fall from a trestle onto the rocks below could result in serious injury and possibly death. Each of these trestles would be removed as a part of this project and the creek crossings would be extended underground.

¹Personal communications with Carl Stanley, Fire Captain, California Department of Forestry (CDF), January 16, 1990; and Mike Martin, Battalion Chief, CDF, March 8, 1990.

IV. ENVIRONMENTAL IMPACTS

An application for environmental evaluation for the project was filed on February 16, 1989. An Initial Study of the proposed project was published on January 12, 1990, and it was determined that an Environmental Impact Report (EIR) would be required for the project. Issues determined to require no further discussion as a result of the Initial Study include land use, light and glare, population, odors, shadows, wind, utilities and public services, and energy. Therefore, this EIR does not discuss these issues. (See Appendix A, pages A-1 through A-19 for the Initial Study.)

Not all of the impacts presented in this section are physical environmental effects as defined by the California Environmental Quality Act (CEQA). Non-physical effects are included here for informational purposes only.

A. WILDLIFE AND BIOLOGICAL RESOURCES

Replacement of the Calaveras pipeline would occur primarily in grasslands, and the riparian woodland of Alameda and Calaveras Creeks. The new pipeline would cross under Alameda Creek five times and would require construction work in less than one-third mile of floodplains. These activities would remove mature riparian trees and temporarily disturb the creek corridors. Pipeline work outside the riparian areas would remove additional mature trees.

Earthmoving and construction noise would temporarily disturb wildlife. Modifications and improvements at the San Antonio Pump Station would remove about 6,000 square feet of landscape vegetation, most of which would be replaced. Partial drainage of the Calaveras Reservoir could temporarily affect aquatic flora and fauna.

Where the pipeline would be replaced along its existing terrestrial location, impacts are expected to be minimal and temporary. The existing route has been maintained as an open grassy corridor without trees and bushes and, consequently, biological resources are limited. Grassy vegetation would be removed; however, it would readily reseed. Although construction noise and soil movement would discourage wildlife use of the project area and adjacent lands, most wildlife species could readily migrate to nearby undisturbed areas and would reoccupy the project area after construction.

Impacts are not expected on steelhead fisheries since the project is scheduled before any restoration activities would take place in Alameda Creek. Minimum streamflow releases from Calaveras Reservoir to support a steelhead fishery in Alameda Creek are considered under the Creek Transfer Alternative on page 151. Releases from Calaveras Reservoir are currently delivered to the treatment plant and/or San Antonio Reservoir by way of an existing pipeline, not through the natural stream channel. Spillage from the reservoir into the natural stream channel has occurred only 13 times in the last fifty years.¹ Thus, the existing reservoir/water delivery system does not provide minimum streamflow for fisheries in the creek, and the proposed project would not change this situation. As discussed in Chapter 2, Project Description, Objectives of the Project Sponsor (page 9), the larger pipeline will be used to allow for operational flexibility during emergencies. It will not be used to transfer additional water from the upper watershed of Alameda Creek to the Calaveras Reservoir, nor will it be used to capture additional water in the reservoir from its upstream tributaries. Thus, downstream flow in Alameda Creek would not change on a permanent basis and the existing and future conditions for fisheries would not be permanently altered by this project.

As the aquatic vegetation associated with the reservoir is only sparse and ephemeral, temporary, gradual lowering of the reservoir's water level during construction is not expected to cause a widespread or permanent change in vegetative cover. Sufficient volume and surface area of water would remain to support most reservoir wildlife. However, the shallow water breeding areas of bass and sunfish would be exposed and their reproduction would be temporarily affected by the April to June drawdown.

Except where otherwise noted, the proposed project is not expected to affect special status species. None of these species were observed during project surveys, and new

sections of the proposed pipeline do not cross into suitable habitat for them. The existing route provides marginal habitat for Alameda whipsnake, black swift, tricolored blackbird, and black shouldered kite. If these species occur in the project area at all, it would be on an occasional or seasonal basis. Temporary earth moving and noise would discourage wildlife use of the project route during construction. The lands surrounding the linear pipeline route provide ample areas which would otherwise be used by these species.

The potential for impact to steelhead trout is negligible as described above. The presence of red-legged frog has not been confirmed in the project area, and additional spring time surveys will be conducted before finalization of this EIR. If red-legged and foothill yellow-legged frogs occur in Calaveras Creek, impacts are expected to be mitigable. Construction will occur only on one side of the creek, and frogs would be expected to move out of the construction zone once disturbance begins. Siltation would be controlled so as not to disturb eggs or aquatic larvae. Creek habitat would be replaced.

Impacts of a more significant level could occur from expansion of the existing route across drainageways and near mature trees, and where the proposed route advances into new areas. These impacts are discussed in detail below.

Replacement of the pipeline would remove three mature trees in upland areas.

Along some of its length, the proposed pipeline would cross into new upland areas which contain mature trees. These trees would be removed. Since the replacement pipe would require a wider trench than the existing pipe, additional mature trees adjacent to the existing route would also be removed.

Figure 17 ("Areas of Potential Biological Impact") illustrates the two valley oaks and a maple tree which would be removed. There are approximately three dozen other upland trees which are in the project vicinity which will not require removal.

Animals nesting or roosting in these trees would lose their habitat. Most arboreal species would be able to relocate to nearby trees, although this would increase competition for habitat and reduce vigor and reproductive success. Some species such as salamanders may

be crushed during the grubbing process. Birds could renest if the trees were knocked down early in the nesting season; however, nestling survival rate would probably be lower. Tree removal would not permanently disrupt wildlife population and therefore is not considered a significant impact to wildlife.

Earthmoving activities would damage additional trees.

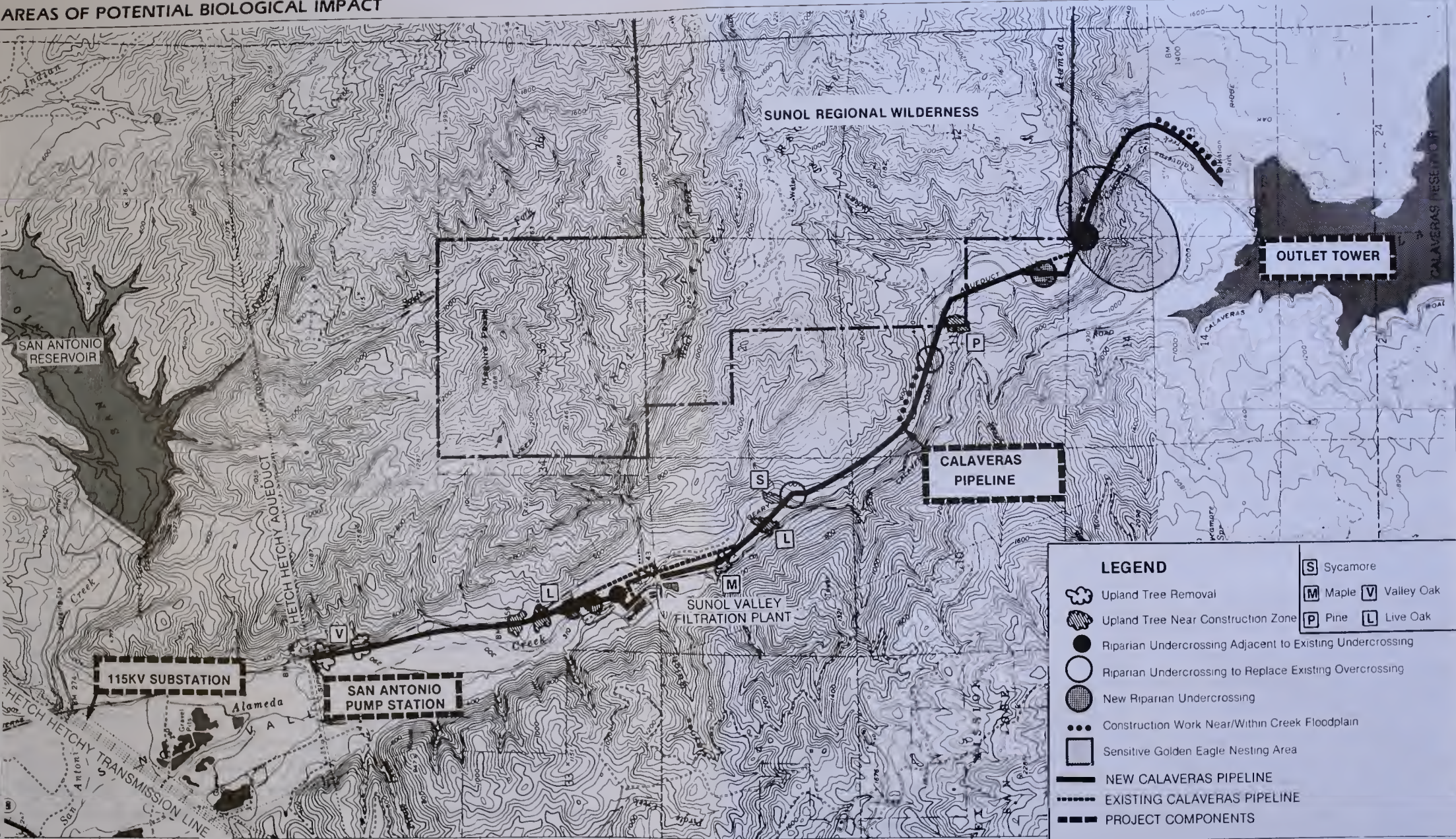
Additional trees which do not occur directly within the project area would be adversely affected if grading, filling, or temporary stockpiling of construction materials or equipment is undertaken within their root zone. Figure 17 ("Areas of Potential Biological Impact", page 93) illustrates those mature trees which would be susceptible to such construction damage.

Lowering the grade near trees would destroy roots and therefore reduce water and nutrient absorption capability. Trees with damaged root systems would also be more susceptible to wind damage and disease. Mounding of soil (or even temporary storage of fill material) near trees inhibits proper gaseous exchange around roots and essentially suffocates the tree. Operating heavy construction equipment or storing it beneath trees can crush roots and compact soil with similar results as mounding of soil. Grade changes which alter the drainage around a tree are also harmful. Saturated soils inhibit gaseous exchange for roots and may accelerate the growth of soil diseases.²

Construction under creeks and in floodplains would require the removal of riparian vegetation.

The method of construction for creek undercrossings has not been specified; therefore a worst-case assumption is made that a coffer dam method will be used. This method would enclose a portion of the creek channel in a cofferdam with the streamflow diverted around the construction area. A trench would be dug within the cofferdam under the flowline of the creek where the pipeline would be placed and covered. The cofferdam would be moved across the creek channel in progressive phases as pipeline sections are installed.

AREAS OF POTENTIAL BIOLOGICAL IMPACT



SOURCE: EIP ASSOCIATES

FEET 0 2000 4000



This technique would remove all riparian vegetation within the construction zone across the channel. Assuming the construction corridor would be restricted to 50 feet at creek crossings, a total of three acres of riparian vegetation would be removed. At existing crossings, this vegetation consists primarily of emergent plants such as cattail and rushes with some medium-size willow and alder trees. Where new crossings are proposed, large mature sycamore, alder, maple, and bay trees would be removed. Vegetation outside of the construction area, especially mature trees, may be adversely affected by disturbance of their roots.

Figure 17 shows the five proposed creek crossings and three areas where the new pipeline would be placed parallel to and within the floodplains of Alameda and Calaveras Creeks. The two new creek crossings would be on Alameda Creek near the southernmost public parking area for Sunol Regional Wilderness, and at the confluence of Alameda and Calaveras Creeks.

The floodplain reaches of the pipeline would be along the existing route on (1) Alameda Creek for approximately 800 feet downstream of Sunol Regional Wilderness, (2) on Calaveras Creek for approximately 800 feet downstream of the tunnel and (3) on Calaveras Creek approximately 900 feet above the tunnel. Exposed bedrock is present in the floodplain along this stretch of Alameda Creek, and riparian vegetation is primarily limited to medium-sized alder trees and cattail within the permanent channel, with some small herbs and bushes, such as common mullein and sagebrush, occurring on the floodplain terrace.

As described under the Setting section (Section III-A, pages 29 through 49), these two floodplain reaches of Calaveras Creek contain exceptional riparian woodland. Mature trees, and well-developed understory and aquatic vegetation would be removed from the construction area within these floodplains.

Riparian wildlife species would move out of the project area during construction to avoid earthmoving and noise. Construction impacts would be unavoidable and fatal to some wildlife species, such as tadpoles. The new creek crossing at the confluence of Alameda and Calaveras Creeks would affect the remnant population of rainbow trout which has limited occurrence elsewhere in the watershed. Channel diversion would allow migration

of aquatic wildlife species to continue. Permanent adverse impacts to wildlife populations would not occur.

Because of the high biological value of the upstream section of Calaveras Creek, temporary disturbance of it during construction is an impact which cannot be mitigated to a level of insignificance. The mitigation measures recommended in Section V-A, pages 123 to 128, however, will reduce the impacts as much as possible, and in the long term will reestablish a protected riparian corridor.

Temporary disturbance of water quality and flow in Alameda and Calaveras Creeks could adversely affect aquatic plants and vegetation.

Erosion of cleared ground, unstable slopes or fill mounds into adjacent creeks would cause turbidity (cloudy water) and sedimentation in the stream channel. Turbidity reduces the photosynthetic potential of aquatic plants and irritates fish gills. Sedimentation may bury and therefore suffocate stream vegetation, bottom-dwelling organisms, and fish and amphibian eggs.

Construction noise could adversely affect golden eagle and prairie falcon nesting above Calaveras Creek.

An active golden eagle nest occurs in the woodland above Calaveras Creek near the old quarry site.⁴ Golden eagles are perennial inhabitants of the area; however, they nest between January and July. Blasting of boulders for placement of the pipeline downstream of the tunnel would produce enough noise to disturb the golden eagles. Depending on the season of the blasting, the nesting pair would either seek out a new nesting site, or abandon an active nest. Renesting may occur in the latter case at a different location. However, the number of fertile eggs laid and the survival of the nestlings are often lower after such a disturbance.

Prairie falcon nest on cliff ledges from mid-February to mid-September. Potential disturbance and renesting success would be similar to that discussed for golden eagle.

Neither of these species are designated as rare or endangered under either federal or California law.

Replacement of the pipeline adjacent to the pump station would require removal of landscape vegetation.

Several pine trees and landscape shrubbery would be removed from an area of 6,000 square feet to place the new pipeline between the pump station and Calaveras Road. Removal of landscape vegetation is considered of little significance because of the small area it covers and the natural setting of the surrounding lands.

¹ Alameda Creek Technical Advisory Committee, Establishment of a Steelhead Fishery in Alameda Creek, May 1989.

² Fraedrich, Bruce R., Preventing Damage to Trees from Grade Changes, Bartlett Tree Research Laboratories, Charlotte, North Carolina, December 1980.

³ Terry Palmisano, wildlife biologist, California Department of Fish and Game, telephone conversation, December 26, 1989.

⁴ Peeters, Hans J., college professor, telephone conversation, December 22, 1989.

B. CULTURAL RESOURCES

The following is a summary of archaeological investigations of CA-A1a-428/H since 1988. As we shall see, these previous investigations have had varying results in determining the site's areal extent, temporal relationships, function and significance. Accordingly, in order to better assess the data derived from the present program of subsurface archaeological testing, the findings and interpretations of the previous research efforts are cited at some length below.

CA-A1a-428/H was first recorded in 1981 by Alan Leventhal and Randel Eacret, who noted that the site was situated "under [the] historic barn (Geary Ranch) Sunol Wilderness Park" (archaeological site survey record for CA-A1a-428/H). The site's horizontal and vertical extent were noted as "unknown." Based upon the initial surface reconnaissance, CA-A1a-428/H was described as a "seasonally occupied processing site."

In June, 1988, Dr. Richard Ambro and Randall Milliken of Holman and Associates conducted archaeological monitoring of a series of mechanically excavated utility trenches in the vicinity of CA-A1a-428/H. The archaeological monitoring program was in part a response to an unsubstantiated rumor that one or more human burials have been previously encountered within the confines of CA-A1a-428/H during excavation of a series of utility trenches in the 1970s.

Ambro and Milliken observed a discontinuous scattering of fire-affected rock, chipped stone and groundstone artifacts and soils of apparent anthropic origin. No formal report resulted from the archaeological monitoring program conducted by Holman and Associates; however, Dr. Richard Ambro did submit his handwritten field notes and stratigraphic profile drawings to Ms. Peggy Shannon of the East Bay Regional Park District. Based upon his observations, Ambro concluded that CA-A1a-428/H did contain subsurface prehistoric/protohistoric deposits of undetermined extent, age and quantity.

In October, 1988, the staff of Archaeological Resource Service (ARS), under the direction of Ms. Katherine Flynn, conducted a limited program of subsurface testing in and around CA-A1a-428/H. A total of five controlled 1 x 2 meter test units were excavated during the course of this research.

Archaeological Research Service's limited testing program was designed to provide data concerning the areal extent, temporal relationships and function of any archaeological deposits encountered. No formal laboratory analysis or interpretation of recovered cultural materials was conducted as part of Archaeological Resource Service's testing efforts. Nevertheless, while their observations differed in some respects from those made previously by Ambro and Milliken, personnel of ARS, determined CA-Ala-428/H to be potentially significant site, but only definitively concluded it to be a campsite.

CA-Ala-428/H was next investigated in April, 1989, when personnel of Ohlone Family Consulting Service (OFCS) conducted additional archaeological investigations at the site. Their research objectives consisted of analyzing and interpreting previously collected cultural materials as well as the excavation and analysis of a single additional 1 x 2 meter test unit.

The only definitive interpretation of the site's temporal placement is offered by personnel of Ohlone Family Consulting Services. After their analysis of the data, OFCS determined that CA-Ala-428/H should be assigned to the Middle Period (pre-A.D. 900) of the Central California prehistoric sequence (195:8-3).

Archaeological testing procedures adduced no evidence to suggest the presence of human burials and/or subsurface cultural features (i.e., house floors, living surfaces, etc.) within, or immediately adjacent to CA-Ala-428/H. However, the possible existence of human burials and/or subsurface cultural features in or immediately adjacent to the site cannot be conclusively eliminated on the basis of data available.

The present field investigations suggest that the greatest quantity of subsurface cultural resources at CA-Ala-428/H may be located in the vicinity of the East Bay Regional Park District's headquarters building and barn, in proximity to the two bedrock mortar features identified as part of CA-Ala-428/H. The proposed alignment for the new pipeline would be located away from this area approximately 400 to 500 feet to the south and southwest.

Recent surface reconnaissance has identified a bedrock milling station in the vicinity of the proposed pipeline alignment, approximately one-half mile east of the East Bay Park District headquarters building. Preliminary investigation suggests that the bedrock

mortar feature is not associated with subsurface cultural deposits, but no testing has been performed to confirm this.

This additional bedrock milling station (not a part of site CA-Ala-428/H) would not be adversely effected by project construction activities because of its distance from the construction zone.

C. GEOLOGY, SEISMICITY AND SOILS

A draft geologic and geotechnical report has been prepared for the proposed project which concluded that the proposed project is feasible with the inclusion of the recommendations of the report in the design of the project.

The principal geologic hazards along the alignment of the proposed project are the potential for damage to the pipeline caused by failure of a slope crossed by the alignment, and the potential for pipeline rupture or damage if alluvial sediments at the stream crossings liquefied as a result of an earthquake. The pipeline also could be damaged directly by rupture of the Calaveras fault. Construction activities also could result in damage to Alameda Creek as a result of scouring at stream crossings. Post-construction impacts could include erosion of the trench backfill on steep slopes after completion of the restoration activities. These impacts are discussed in detail below. The mitigation measures for them are discussed in Chapter V, pages 123 through 146.

Rupture of the pipeline caused by slope failure would result in local flooding and erosion.

Numerous slope failures have occurred within the various formations in the vicinity of the proposed project. Six potentially unstable areas along or near the proposed alignment were identified in the Asg, Inc. geologic/geotechnical report.¹ If failures occur or recur they may damage or rupture the pipeline. Rupture of the pipeline would result in local flooding and erosion. Assuming a maximum operational flow of 13.2 feet per second² and a cross-sectional area of 23.76 square feet for the 66-inch-diameter pipeline, immediately after rupture, water would be released at a rate of 313 cubic feet per second. In addition, depending on where rupture occurred, up to 260,000 cubic feet of water (already in the pipeline) would be released before the valves at the Calaveras Reservoir and/or the Sunol Valley Water Treatment Plant could be shut down. If this release occurred on a hillside, severe erosion would occur.

Slope failure during construction could result in injury or death. At several locations along the alignment the trench would be excavated at the base of a steep, potentially unstable slope. Although the pipeline probably would not be damaged by failure of these slopes after completion of construction, failure during construction could result in injury or death. A combination of high groundwater at the creek crossings and the presence of

unconsolidated soils could create unstable slopes in the trench excavation during construction. Shoring (discussed on page 132) would mitigate this impact completely.

Earthquake faulting could result in rupture of the pipeline. Damage to the pipeline from faulting could be expected to consist of shearing and rupture of the pipeline. These abrupt differential movements can be accommodated only if a pipeline can deflect vertically or horizontally relative to the surrounding soil. The degree to which faulting-induced rupture can be avoided would be determined by a geotechnical investigation which is part of the project.

Earthquake-induced liquefaction of soils could damage or rupture the pipeline. Earthquake-induced liquefaction of soils, supporting any structure with a net bearing load would result in a loss of shear strength in the liquefied soils, and a loss of support for the structure. Severe and uncontrollable differential settlement likely would result. Buried structures and pipelines founded in liquefiable soils below the ground water table would be subject to uplift forces because of their buoyancy. An additional design consideration in areas of liquefiable soils is the potential for lateral spreading. If the pipeline is buried in competent soils that overlie deeper liquefiable soils, liquefaction of the deeper layers may result in substantial lateral spreading of the upper competent soil. Lateral spreading can result in substantial lateral pressures as the competent layer tries to pull the structure along. Lateral spreading may occur on slopes as gentle as two percent and can extend several hundred feet back from the toe of the slope. Both liquefaction and liquefaction-induced lateral spreading could cause significant damage to the pipeline. The geologic/geotechnical study by ASG, Inc. indicates that the majority of the subsurface soils along the proposed alignment are not liquefiable.¹ However, some loose to medium dense, saturated sandy soils exist at some locations and some localized liquefaction is anticipated during a major earthquake. Potential for lateral spreading at the project site is low. The loose and liquefiable soils would be evaluated as part of a geotechnical investigation discussed in Section V-C, page 132.

Slopes exposed during construction would be subject to erosion. Preparation of the alignment for trenching operations would include removal of topsoil and existing vegetation along a right-of-way approximately 10 to 30 feet wide. Locally, sidehill or cross-slope cuts would be necessary to provide sufficient working area for trenching and

pipe-laying operations. In addition, slopes at the stream crossings probably would be laid back to reduce their gradient before excavation of the trench. If not properly restored, these areas would be subject to erosion.

Erosion at the stream crossings would expose the pipeline to damage if the channel was worn down below the four- to six-foot depth of burial. This impact is unlikely to occur because the stream bottom is stable.

Removal of vegetation from the stream banks would expose the banks to increased erosion.

¹Dibblee, T.W. (1980) Preliminary Geologic Map of the La Costa Valley Quadrangle; U.S. Geological Survey Open File Report 80-533A and Dibble, T.W., (1972) Preliminary Geologic Map of the Calaveras Reservoir Quadrangle; U.S. Geological Survey Open File Report 73-58

²Public Utilities Commission, Utilities Engineering Bureau, City and County of San Francisco, Conceptual Engineering Report, Calaveras Pipeline Replacement, 1989.

D. VISUAL QUALITY

For the purposes of this analysis, adverse visual impacts are considered to be degrading changes in the existing aesthetic condition of the area, especially as viewed from the designated scenic corridor (Calaveras and Geary Roads) and public parklands. Visual impacts of the proposed project are discussed below by project component.

All aspects of the proposed project would take place within a 5.5-mile corridor within Alameda County. The proposed project would consist of three components. Each component will be discussed with regard to potential visual impacts of the proposed project. The first component would replace the existing 44-inch diameter Calaveras pipeline with a 66-inch water transmission line. Secondly, the existing San Antonio Pump Station would be modified. Finally, outlet facilities at the Calaveras Reservoir would be improved.

Component 1 -- Pipeline Replacement

The existing pipeline has been in place since installation in 1934. Over most of its 5.5-mile route, the pipeline is buried and is not visible with the exception of five stream trestle crossings and several short segments of exposed pipe. Currently, the pipe is buried to an average depth of eight feet. Replacement pipe would be at a depth of approximately 10 to 11 feet; cut and cover construction techniques would be employed throughout the entire length of the pipeline corridor.

The proposed project would remove the existing pipeline and replace it with a larger diameter pipe in the proposed alignment. Construction would take place within a 50-foot wide corridor. Mitigations proposed as part of the project and discussed in detail beginning on page 136, include revegetating all cleared and excavated areas. In addition, cleared areas would be revegetated with riparian species as required by the California Department of Fish and Game.

From the San Antonio Pump Station to the Sunol Valley Water Treatment Plant, the proposed pipeline would be installed underground on the west side of Calaveras Road and would generally follow the route of the existing pipeline adjacent to the road and through an ornamental tree nursery operated by the Valley Crest Tree Company. The proposed

route would break west from the valley floor and connect up-slope with the existing Sunol Valley Water Treatment Plant. From the treatment plant, the proposed pipeline would follow the west side of Calaveras Road until its intersection with Geary Road. The proposed corridor would follow the west side of Geary Road, then cross to the east side, traversing private grazing land on the east side of the valley. At this point pipeline construction would be out of view from Geary Road. At the entrance of the Sunol Regional Wilderness (see Figure 14(B), page 68), the proposed route would cross Geary Road and enter the park. Figure 13(A) (page 67) illustrates the existing visual character of the portion within Sunol Regional Wilderness which would be traversed by the pipeline. The pipeline would again generally follow the existing alignment through the park, varying near the corral and passing by the entrance to the area called "Little Yosemite." From the Little Yosemite entry point to the chlorine plant at the Calaveras Reservoir, the proposed pipeline route would be the same as the existing route.

Adverse and beneficial visual impacts would be expected from both the removal of the existing pipeline and construction of the new one. The most prominent visual change expected to occur along the existing pipeline route would result from burying the entire length of the pipe, especially at trestle stream crossings. Figures 15(A) and 15(B) (page 69) illustrate the existing visual condition of two trestle crossings which would be removed under the proposed project. Other impacts would be attributed to the removal of vegetation within the construction corridor, revegetation of the disturbed area, terrain modification, and construction staging. Each of these potential impacts is discussed below. Impacts would either be short-term temporary, or permanent. Short-term temporary impacts would persist through the construction phase. Construction of the 5.5-mile pipeline would take approximately 18 months, commencing in January 1991.

Burying the pipeline over the entire length of the proposed corridor would result in a permanent change in the existing visual character of the route. No aspect of the proposed pipeline would be visible following restoration of the trench and establishment of landscaping. Existing trestle crossings would be permanently dismantled.

Vegetation would be disturbed within a 50-foot construction corridor over the length of the pipeline alignment. Two mature Valley Oak trees, located along Calaveras Road (a designated scenic corridor) near the San Antonio Pump Station would be removed to

accommodate the proposed buried pipeline. One mature maple tree along the south side of the intersection of Calaveras and Geary Roads would be lost to pipeline construction impacts. Additional trees may be disturbed or damaged by construction activity in the project corridor. Proposed construction would remove vegetation and result in short-term visual impacts in the construction corridor and staging areas. This may conflict with principles of the Scenic Corridor element of the Alameda County General Plan.

Grassland and low shrubs would be disturbed as the existing pipeline is removed and the new pipeline installed.

Cut and cover construction techniques may require terrain modification which may adversely impact the visual character of the area. Impacts would be visible from public hiking trails in the Sunol Regional Wilderness and from Calaveras and Geary Roads.

Dismantling of existing pipeline trestles over streams and placement of the pipeline beneath the stream corridor would impact the existing appearance of the area during and following construction. Short-term temporary impacts would occur during dismantling of the existing pipeline and installation of the new pipeline. Excavation, clearing and construction would add visual complexity to the existing scene. Sections of affected creeks may be temporarily diverted to facilitate construction.

The visual clutter and activity of construction storage and staging areas may result in short-term temporary impacts detrimentally affecting the visual character of the project corridor views from area roads and Sunol Regional Park trails. Views from these byways may be adversely affected for the duration of construction activity.

Component 2 -- Modifications to the San Antonio Pump Station

The San Antonio Pump Station occupies 1.3 acres adjacent to Calaveras Road, approximately 2 miles south of its intersection with Highway 680 in Sunol. One building and associated parking are partially screened from Calaveras Road by existing landscaping; a loop driveway provides access to and from the facility.

Proposed modifications to the San Antonio Pump Station are intended to increase the pumping capacity of the plant. Three new electric pumps would be added to supplement

existing equipment. The electric pumps would have waterproof steel housings mounted on concrete pads 12 to 18 inches above grade. No structure would cover the pumps. Together, the pump and motor would be about 6 feet in height by 6 feet in width by 12 feet in length. Their location would be approximately 60 feet west of Calaveras Road. The pumps may be partially visible from Calaveras Road, but would be consistent with the existing visual character of the site.

Additional electrical power would be required to operate the upgraded pumping equipment, necessitating the installation of a 21-kV distribution line. The new distribution line would extend from the existing 115-kV crossing at Calaveras Road to the pump station, then on to the Sunol Valley Water Treatment Plant. While the exact location has not been determined, the project sponsor has proposed that the 21-kV distribution line be located on the west side of Calaveras Road. Several siting options are possible, including siting the line adjacent to Calaveras Road or, setting the poles at least 150-feet back from the centerline of the road. Clearing for the line would potentially trigger environmental impacts similar to those described for the installation of the pipeline. Mature oak trees within the utility easement may be removed to accommodate the 21-kV poles and line. If the line was located near Alameda Creek, riparian vegetation may be adversely affected. California General Order 95 stipulates that tree branches must be trimmed so as not to disrupt service or maintenance of utility lines. Additional field studies would be necessary to determine the extent of impacts and the best siting for the proposed line.

Conventional electrical substations would be located at each end of the distribution line and at the pump station. A typical substation consists of transformers and switchgear; 21-kV transformers and switchgear are typically less than 5 feet in height and may be enclosed in metal cabinets. Transformers typically are set on low pedestals. The proposed 21-kV distribution line and substation would be constructed entirely on property owned by the San Francisco Water Department. Chain-link or redwood slat fencing would surround the proposed substation.

Other modifications to the pump station as proposed under the Calaveras Pipeline project include the removal of two buried 9,000-gallon diesel fuel tanks and replacement with above-ground tanks of the same capacity. The new tanks would be about 9 feet in height, 40 feet in length, 6 feet in diameter; mounted side by side, approximately one foot above

grade. A masonry wall would be constructed to screen views of the tanks from Calaveras Road. Other improvements proposed for the San Antonio Pump Station include installation of a pre-fabricated structure on top of the existing berm for hazardous material overflow; and, expansion of existing office space. Construction would be scheduled to take place over 12 months, beginning in July 1991, and continuing until June 1992.

Several visual impacts would be expected to occur if proposed improvements are carried out at the San Antonio Pump Station. Installation of poles and the proposed 21-kV electric distribution line within the Calaveras Road designated scenic road corridor about conflict with principles of the Alameda County Scenic Routes Element of the General Plan. The Scenic Routes Element in its principles applying to Scenic Route Corridors states: "Underground Utility Distribution Lines When Feasible; Make Overhead Lines Inconspicuous." Furthermore, the principle suggests locating lines so as to be inconspicuous from the scenic corridor, when undergrounding is infeasible; or, using common poles or combined rights-of-way when feasible.

Four options for siting the 21-kV electric distribution line are possible. Under the proposed option, the line would be sited on the west side of Calaveras Road, near the road corridor. A second option proposes that the line be installed on the west side of Calaveras Road, but at least 150 feet from the centerline of the road. This option evolved in an attempt to screen the line from view within the scenic corridor. The third option would be to share the existing PG&E utility poles on the east side of Calaveras Road. The last option would be to underground the 21-kV line on the west side of Calaveras Road.

Under the first two options, the proposed 21-kV distribution line, poles and substation would be visible from Calaveras Road, a County-designated Scenic Road corridor. If the line were to be sited away from the road, visual impacts may still occur, as vegetation is cleared to site and maintain the line.

Option 1. Siting the 21-kV source on the west side of Calaveras Road would facilitate installation, maintenance and reliability of the system, but, the view from Calaveras Road would be impacted. However, pole lines sited within the road easement, such as the proposed 21-kV line, are a common element of view corridors in rural and scenic areas. Siting of the line to avoid mature trees would decrease visual impacts.

Option 2. Under the second option, siting of the 21-kV distribution line a minimum of 150 feet from the centerline of Calaveras Road, long-term visual impacts would occur. Clearing of a corridor to facilitate the installation and maintenance of the line would result in a visual scar on the landscape. As surrounding vegetation matured, the utility easement would remain obvious if removed for the utility corridor. Views from Calaveras Road and surrounding hiking trails may also be affected, and, clearing could trigger other environmental impacts.

Option 3. The third option proposes sharing the existing utility poles on the east side of Calaveras Road. Existing poles are approximately 35 to 40 feet in height, and currently carry three 12-kV electric lines near the top of the pole and a telecommunications line and conductors approximately 10 feet below the PG&E lines. If the 21-kV line was added to the existing pole line, taller poles would be needed to accommodate all utilities with appropriate clearances as required under General Order 95. The view of the existing utility line would become more visually complex with the addition of the 21-kV system. Furthermore, maintenance of three separate utilities would be cumbersome; and finally, the reliability of the entire system would be at risk if a windstorm or traffic accident resulted in failure of a utility pole and downed lines.

Option 4. The final option would be to underground the 21-kV line, except for a short section where it would cross Alameda Creek. The line would be encased in concrete and installed below ground. No long-term visual impacts would result, with the exception of the Alameda Creek crossing; and short-term impacts would occur during construction as excavation and installation of the line takes place. This option presents several potential problems including: vulnerability of the electric line to digging and floods; high cost; maintenance problems, especially locating trouble spots on the line.

Modifications to the pump station would include the excavation and removal of two buried 9,000-gallon diesel fuel tanks, and replacement with above-ground tanks. The two new 9,000-gallon tanks would be approximately 10 feet in height, 40 feet in length, 6 feet in diameter, and would be mounted side by side approximately 1 foot off the ground. A masonry wall would screen the tanks from view. The net visual effect would be that the pump station would be more visible from Calaveras Road due to the visibility of additional equipment. Other improvements proposed include adding a pre-fabricated shelter on top

of the existing berm for hazardous material overflow, and expansion of existing building space. Construction would be scheduled to take place over 12 months, from July 1991 to June 1992.

Component 3 -- Modifications to the Calaveras Reservoir Outlet

The Calaveras Reservoir and dam are not accessible to the general public; however, they are visible from several hiking trails of the Sunol Regional Wilderness (Flag Hill, Eagles' View, McCorkle Trail, Cerro Este Road).⁵ Existing facilities have been incorporated into the landscape where possible. Decking and the existing pipeline are painted green to blend in with the landscape.

While the lands within the Calaveras Reservoir and San Francisco Watershed are not open to the public, portions are highly visible from trails in the Sunol Regional Wilderness. Proposed improvements to the Calaveras Reservoir Outlet would not be expected to result in visual impacts to the facility or to views accessible from surrounding areas. No exterior work would be done to the outlet tower and tunnel because only the components housed within the tower and tunnel would be replaced. Elements to be replaced would include outlet valves, the standpipe and pipeline, electrical wiring, control system, steel platform and handrailing. No mitigation measures would be required for proposed improvements to the Calaveras Reservoir outlet.

¹Geotechnical Survey Report, Proposed Calaveras Pipeline, By AGS, INC.; July 1989.

²Telephone Conversation with Betty Crowley, Alameda County Assistant Planning Director, January 2, 1990.

³East Bay Regional Park District, Master Plan 1988, April 20, 1988; pp. 19 - 20.

⁴Telephone Conversation with Jim Huemmer, Transmission Engineer, Pacific Gas and Electric; January 2 and 9, 1990.

⁵Telephone Conversation with Paul Ferreira, Supervising Naturalist, Sunol Regional Wilderness; January 9, 1990.

E. TRANSPORTATION

Project-generated traffic would occur only during construction and would be due to the regular trucking of excavated material out of the project area, to the intermittent delivery of equipment and supplies and to the daily morning and evening commuting of construction workers. The types of vehicles using the roadways due to the project are three-axle dump trucks/transporters, 1/2-cubic-yard hydraulic cranes/excavators and two-drum compactors. Temporary access roads would not be needed for this project. Existing roads would provide access to the proposed pipeline alignment.

Once the proposed project has been completed, its operation would not change traffic conditions as they presently exist. A traffic origin and destination study on Calaveras Road has not been performed. However, as can be seen by comparing the average daily traffic volume on Calaveras Road between Location 1 and Location 4 (Figure 16, page 75) as presented in Tables 2 (page 73) and 3 (page 74), traffic volumes drop sharply after the entrance to the park, indicating that it is the major destination of local traffic.

There are several concerns associated with construction traffic. Slow-moving construction equipment would conflict with the 40-50 mph vehicular traffic. Pipeline crossings of Calaveras Road and Geary Road would also disrupt local traffic. It is very unlikely that pipeline construction across half the road is feasible. The width of the trench would require extensive shoring of the trench walls if steel crossing plates were used, resulting in greater expenses and delays than would be caused by a simple detour. Construction traffic on narrow Geary Road, particularly at the one-lane, two-way section, would conflict with traffic into Sunol Wilderness Area. Internal circulation and parking facilities would also be disrupted in the park. Some heavy equipment damage would occur to Park and County roads. Each of these impacts are discussed below.

Slow-moving construction traffic constitutes potential for traffic back-up and for rear-end collisions by Calaveras Road and Geary Road traffic, averaging 45 mph and 40 mph, respectively.

Project-generated traffic would be due to the intermittent delivery of equipment and supplies and to the regular trucking of excavated spoils out of the project area. Although excavated material would be used as backfill for the new pipe, with the leftover spoils

being spread on local SFWD lands, sand would be imported as bedding and covering material for the pipe. As discussed in the Project Description (page 17), up to 32,000 cubic yards, or 1,600 truckloads, of sand would be required. This translates into an average of four truckloads of sand delivered to the site each day over the course of construction. Trench excavation and attendant sand delivery would occur gradually over the course of construction. In a conservative worst-case scenario, up to 20 truckloads of sand would be delivered to the project site in a single day. This would be less than three trucks per hour and would not be considered a significant impact.

The traffic impact from sand delivery would be more pronounced along Calaveras Road from 680 to the entrances to the quarries, a distance of about 1.3 miles. Delays could occur if faster travelling automobiles were caught behind relatively slower moving trucks.

Additional morning and afternoon commute traffic would be generated by the construction crews. Reliable estimates of the construction crew size are not currently available (January 1990) for improvements at the pump station and the reservoir outlet works; the number would probably not exceed 15 at each location. For work on the pipeline, a maximum of 41 would work on any given day, including a supervisor/inspector.

Traffic along Calaveras Road heading to and from Calaveras Reservoir would be obstructed by construction activities.

The new pipeline is scheduled to cross Calaveras Road immediately south of its intersection with Geary Road, interfering with Calaveras Road traffic travelling toward Calaveras Reservoir. Due to the width of the pipeline trench, it would be difficult to place steel crossing plates. Consequently, the road would have to be temporarily closed, probably for no more than one day.

Truck traffic on Geary Road could impede traffic flow and create hazards, particularly at the stretch of one-lane, two-way roadway.

Truck traffic is already prohibited on Geary Road to compensate for the narrow width and the one-lane, two-way section, and possibly for structural constraints. Construction truck traffic would violate this prohibition and increase traffic hazards.

The pipeline construction traffic may affect the internal circulation within the Sunol Wilderness Area, temporarily disrupting park patrons and staff.

Heavy construction equipment could damage Park and County roads structurally incapable of supporting the heavy axle loads. Some portions of roadway would be torn up and restored during construction. The replacement pipeline would involve three road crossings where trenching through the roadway would be necessary.

F. NOISE

The existing pipeline presently generates barely-discernible noises and no increase in such noises would be anticipated from operation of the proposed project. The proposed project would result in placement of a new underground pipeline through East Bay Regional Park District property where the pipe is currently above ground. This would result in a net reduction in noise generated. Temporary impacts on noise levels would occur during construction of the proposed pipeline. Potential construction noise effects on biological resources are discussed in Section IV-A, pages 89 through 97.

The project would result in temporary elevation of ambient noise levels along and near active portions of the pipe trench during construction. Diesel-powered trenching machines, jack hammers and dead-weight rock crushers would generate between 80 and 105 dBA peak impact noise levels as measured at a distance of 50 feet.¹

It may be necessary to use blasting along some portions of the alignment which are blocked by large boulders. Peak noise levels of 105 dBA would be achieved during blasting procedures. It is anticipated that noise levels of this intensity would occur at any one location for periods of up to one to two weeks. This impact could have an adverse effect on wildlife in the area, which is discussed in the impacts on biology (pages 89 through 97).

Haul trucks and other machinery would also increase noise levels along Calaveras road throughout project construction and along Geary Road in the Sunol Regional Wilderness Area during one two-month phase. Fully-loaded diesel trucks travelling uphill can achieve noise levels in the range of 75 to 85 dBA. All construction noise effects would be anticipated to occur between May 1991 and June of 1992.

Short-term interference with recreational activities could result from the project and would be limited to intrusion of construction noise into otherwise quiet environments.

Beyond several hundred feet, project contributions to area ambient noise levels would be similar to those created by loud trucks, cars and motorcycles along Geary and Calaveras Roads or by aircraft overflights. This type of noise would be far below thresholds established by the EPA and the Federal Occupational Safety and Health Administration as

protective of public and worker hearing.² Although the EPA does not have any noise level criteria specific to parks or recreation areas, the State has standards for ambient noise levels in the vicinity of land uses such as golf courses, riding stables, water recreation, and cemeteries. The State guidelines state that ambient conditions in excess of 70 dBA are considered to be "normally unacceptable" and/or "clearly unacceptable."³

Noise associated with the proposed project would be short-term and would not affect ambient conditions in the Sunol Wilderness Area because it is not a permanent incompatible land use in the sense addressed by these guidelines. Therefore, while noise levels in the range of 75 to 85 dBA, with peaks up to 105 dBA, are not consistent with such a standard, the standard was not developed to regulate the proposed activity.

Two-way radios could be damaged by blasting which may occur as a part of project construction. In addition to noise energy, blasting also releases pulses of electromagnetic energy which can affect sensitive modern electronic components.

Due to the isolated, rural nature of the proposed alignment, and the one- to two-week period during which any one location would be directly affected by construction activity, it would not be anticipated that construction activities would have a significant, adverse effect on humans in the area, as defined by the EPA and OSHA.

¹ Bolt, Beranek and Newman, Noise from Construction Equipment and Home Appliances, Environmental Protection Agency, December 31, 1971.

² The Federal Environmental Protection Agency (EPA) has stated that an L_{eq} of 70 dBA is the maximum 24-hour exposure necessary to protect hearing. If the exposure period is reduced to 8 hours, a maximum L_{eq} of 75 dBA has been indicated as protective of hearing. The Occupational Health and Safety Administration limits employee exposure to peak impulse (impact) noises to no greater than 140 dBA. Source: Noise Effects Handbook, State of California Department of Health Services, 1981.

(L_{eq} is another way of referring to time-averaged noise energy, typically for periods less than 24 hours. L_{eq} is defined as the equivalent steady-state sound level which, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same time period.)

³ California Office of Planning and Research. State General Plan Guidelines, Appendix A: Noise Element Guidelines, page 227, 1987.

G. AIR QUALITY

Project air quality impacts comprise two categories: temporary impacts due to construction and long-term permanent impacts due to operation. Impacts in each category can be classed as having effects on regional or local scales. This project could only have a temporary construction-related impact on air quality.

Regional Construction Impacts

The quantities of particulate, construction equipment exhaust, and excess pollutants emitted by motor vehicles stopped or slowed by the congestion of local streets due to construction activity could significantly affect ambient pollutant levels. Projected emissions related to construction activities are presented in Table 7. Estimated construction emissions do not exceed one percent of County emissions, one criterion defined by BAAQMD for determining a significant impact. Emissions of nitrogen oxides (NO_x) and PM₁₀ trigger the Best Available Control Technology by exceeding the respective limits of 150 lbs/day and 75 lbs/day. Triggering the BACT is a second criterion defined by the BAAQMD for determining significant air quality impacts. BACT, defined in Section 2-2-201 of the BAAQMD Rules and Regulations, is required for all new and modified stationary sources which exceed any of the threshold limits set forth in Section 2-2-301 of the standards.

Local Construction Impacts

Clearing, excavation and grading operations, construction vehicle traffic on unpaved ground, and wind blowing over exposed earth surfaces all generate dust. Therefore, construction in the area of the proposed site would temporarily increase PM₁₀ concentrations and could lead to violations of the federal and State 24-hour average PM₁₀ standards if dust suppression measures were not implemented.

It is not possible to estimate accurately the PM₁₀ concentrations that would occur at or adjacent to the construction sites because such concentrations are very sensitive to local meteorology and topography, to variations in soil silt and moisture content, and to the level of equipment use. However, EPA measurements made during apartment and shopping center construction provide a rough indication of the maximum rate of particulate emissions. These measurements indicate that approximately 1.2 tons of dust

TABLE 7
EMISSIONS FROM CONSTRUCTION ACTIVITIES (lbs/day)

Equipment ¹	#	Emission			
		CO	HC	NO _x	PM ₁₀
Track-type Tractor	2	5.5	1.9	20.2	0.9
Motor Grader	1	1.2	0.3	5.7	0.2
Track-type loader	1	1.6	0.8	6.6	0.2
Roller	1	2.4	0.5	6.9	0.2
Wheeled Tractor	1	28.7	1.5	10.2	0.5
Scraper	1	10.1	2.3	30.7	1.6
Wheeled Loader	2	9.2	4.0	30.2	1.4
Hydraulic Excavator	2	10.8	2.4	27.1	1.1
Mobile Crane	2	10.8	2.4	27.1	1.1
Subtotal		80.3	17.6	164.7	7.2
Soil Disturbed	10 acres	0.0	0.0	0.0	600.0
Total		80.3	17.6	164.7	607.2
<u>Alameda County (1990)</u>					
Construction Emissions		3,000	9,990	3,500	31,300
Total Emissions		917,000	200,000	140,000	125,000
<u>Emission Quantities Triggering BACT</u>		550	150	150	75

Notes:

- o Based on eight-hour work day.
- o PM₁₀ fraction estimated to be 50% of total particulates.
- o Factors for Emissions from Heavy-Duty Construction Equipment from EPA, Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources, Fourth Edition, September 1985. Table II-7.1.
- o Factors for Emissions from Fugitive Dust Sources from EPA, Compilation of Air Pollutant Emission Factors, Third Edition, August 1977.
- o Values used for Hydraulic Excavator and Mobile Crane were derived from miscellaneous equipment in Table II-7.1 of EPA-AP42 document.
- o Emissions for Alameda County derived from Tables VI-A-1 and VI-A-2 of the Air Quality and Urban Development Guidelines for Assessing Impacts of Projects and Plans.
- o BACT = Best Available Control Technology.
- o NO_x = nitrogen oxides.

¹ Ralph Herrera, Utilities and Engineering Bureau, City and County of San Francisco, facsimile transmission to EIP Associates, March 1, 1990.

are emitted per acre per month of construction activity. Much of this dust is comprised of large particles which would settle out rapidly on nearby horizontal surfaces. Large diameter particulate matter generated by construction are, therefore, of concern more as a soiling nuisance rather than for its unhealthful impacts. However, the remaining fraction of PM_{10} may aggravate the respiratory problems of people living and working nearby. Possible receptors of PM_{10} in the vicinity of the construction site include the inhabitants of a park ranger residence and visitors to the park.

Construction vehicles/equipment would emit exhaust at the construction sites. Large numbers of such vehicle/equipment operating or idling in a small area may cause spot violations of the CO standards. Odors of construction equipment exhaust would probably be noticeable in the environs of the project site for the duration of construction.

The removal of two 9,000 gallon diesel fuel tanks and replacement with above-ground tanks could result in the emission of hydrocarbons. Under the BAAQMD Regulation 8, Rule 40, Aeration of Contaminated Soil and Removal of Underground Storage Tanks, removal of underground fuel tanks must be reported to the BAAQMD. The purpose of this rule is: 1) to limit the emission of organic compounds from soil that has been contaminated by organic chemical or petroleum chemical leaks or spills, 2) to describe an acceptable soil aeration procedure, and 3) to describe an acceptable procedure for controlling emissions from underground storage tanks during removal or replacement.

The standards governing underground storage tank removal and aeration of contaminated soils are covered under BAAQMD Regulation 8-40-300. Soils samples should be taken during excavation of the tanks and tested for organic content based on the BAAQMD regulations set forth in Section 8-40-602. If soils on the site are contaminated from leaks in the underground fuel tanks additional administrative requirements would take effect.

The installation of two new 9,000 gallon diesel fuel tanks in the proposed project introduces the potential of an accidental spill or leak. Emissions of hydrocarbons related to the spill would be of short duration due to the emergency response of such an accident.

In the interim between when the spill occurs and when it is collected, volatile hydrocarbons would be emitted. These emissions would contribute to the production of ozone and could potentially contribute to exceedances of the ozone standard.

¹Bay Area Air Quality Management District, Rules and Regulations Volume I, Regulations 1 through 8, pg. 8-40-3.

H. WATER QUALITY

The basic criteria applied to the analysis of potential water quality impacts is whether or not implementation of the pipeline project would increase the contaminant load of the receiving waters. It is recognized that project construction activities may have other effects on the hydrologic character of the alignment, but, except as the effects related to the protection of habitat, they are not considered significant. Biologic considerations related to the potential water quality impacts are mentioned in this section and are discussed more fully in Section IV-A (pages 89 through 97).

Soil eroded during construction could adversely affect water quality.

Construction of pipeline creek crossings would disturb the creek bed and banks in several locations exposing new soil surfaces that would be vulnerable to erosion. During the rainy season following construction and possibly thereafter, the disturbed area could contribute increased quantities of particulate materials to stream flow. The increased particulate load would affect water quality only during high or storm flows. Water quality during normal or low flows would be unaffected.

Because both creeks are dry except for isolated ponds during the summer months no construction is expected in flowing water. If construction in wet areas proves necessary it would be undertaken within coffer dams or the stream would be diverted around the construction site. No adverse effects on water quality would occur during construction activities.

I. HAZARDS

The discontinued flow of water through the pipeline during construction and the removal of the water tap located on the pipeline within Sunol Wilderness Area would not represent any change in existing conditions with respect to fire control, and therefore no adverse impact would occur. In the event of a fire in the project area during or after construction, it would be combatted by the California Department of Forestry, which is also currently responsible for fire fighting in the project area..

Sparks from the internal combustion engines of construction equipment and trucks could ignite a fire in the project area during dry summer months. Similarly, sparks from the welding, cutting and grinding of steel pipe would pose a potential fire threat. These impacts would be completely mitigated by the measures discussed in Chapter V on page 144.

Unsealed portions of exposed pipeline would pose a potential safety hazard. All such openings to the existing pipeline which are abandoned in place would be plugged as part of the project, and thus adverse impacts would not occur.

Rupture of the pipeline would result in local flooding, as discussed in Section IV-C, page 101. Even with the expected volume of water which would flow into the channel of Alameda Creek with such an event, hazards to human health would not result.

As mentioned in the section on Geology (see page 101), slope failure during construction could result in injury or death. Shoring would mitigate this impact completely (see page 132).

If disruption of telephone service to the Sunol Wilderness Area Headquarters and the 17 private residences on Welch Creek Road occurs during construction due to the accidental severing of transmission lines, the affected parties would be without access to emergency services.

V. MITIGATION MEASURES

State law requires that a reporting program be set up and incorporated into the project for monitoring mitigation measures that are made conditions of approval for any project that would otherwise have significant environmental effects. Therefore, the replacement of the Calaveras Pipeline as proposed by the San Francisco Water Department will include a mitigation monitoring program to ensure compliance with all the mitigation measures required as conditions of project approval. The details of such a program, which could include activities by the Water Department, the Department of City Planning, other city agencies and/or outside consultants, will be included in the final presentation of the pipeline replacement project to the San Francisco Public Utilities Commission.

The mitigation measures presented in this chapter are intended to reduce the significance of the impacts discussed in Chapter IV, pages 89 through 122. Except where otherwise indicated, all of the mitigations in this chapter would be included in the proposed project.

A. WILDLIFE AND BIOLOGICAL RESOURCES

In addition to the mitigation measures discussed below, a variety of construction measures would be required as conditions of permits from the California Department of Fish and Game and the U.S. Army Corps of Engineers, which would be required for work in the channels of Alameda and Calaveras creeks. Section 1601 of Chapter 6 of the California Fish and Game requires Streambed Alteration Agreements for any project which will divert, obstruct or change the natural flow or bed of any stream with fish or wildlife resources. Streambed Alteration Agreements are issued by the California Department of Fish and Game which generally require dry season construction periods, and the replacement of all streamside mature trees on a three-to-one basis.³

Installation of utilities in wetlands qualifies for a nationwide permit under the US Army Corps of Engineers dredge and fill program authorized by the Clean Water Act. Nationwide permits are intended to authorize certain activities with little delay or paperwork. Under this program, placement of the utility line must not result in any change in preconstruction bottom contours. Thus, excess material must be removed to an upland disposal area. Certification from the California State Water Quality Control Board would also be required under the Corps permit.

All removed mature upland trees would be replaced with trees of the same species on a ten-to-one basis, with a five-year maintenance and monitoring program, and supplemental planting when necessary.

Saplings of the same species and of at least one-gallon nursery size would be planted as replacement trees. Since the trees which would be removed are very large, and it would be many years (50+) before any of the replacement trees will attain a size with comparable value, replacement plantings would be undertaken at a ten-to-one ratio. The saplings would be placed in uneven clusters (mimicking natural randomness) at locations as close as possible to the former location of the removed tree, but at least 50 feet away from the new pipeline location so that root systems will not damage the pipeline.

Protective wire mesh exclosures would be used to prevent grazing by cattle, feral pigs, deer and rodents. Watering would be provided as necessary.

A five-year monitoring program would be established by the project sponsor wherein the replacement trees are checked twice annually (in the spring and fall) and necessary maintenance such as watering, weeding, and replacement or removal of exclosures is undertaken. Supplemental planting would be undertaken as necessary so that at least 50% of the saplings survive the five-year monitoring period. Annual fall reports regarding planting, maintenance, and survival rate would be submitted to the California Department of Fish and Game and the Office of Environmental Review for the City and County of San Francisco.

A professional arborist would be consulted prior to development of the grading plan and during the construction phase to confirm which trees will be irreparably damaged by the

project, and for detailed instructions on planting and maintenance of replacement trees. A professional arborist is recommended because it will be important to make on-site decisions based on the final design and specific construction constraints. Planting and maintenance of replacement trees will also be more successful under the direct guidance of a professional arborist.

Grade changes beneath the crown of mature trees would be avoided wherever possible. Terracing and retention walls around trees would be used where possible to prevent excavation within the root zone. Root loss may be compensated with branch and root pruning, fertilization, and more frequent watering. Dry wells and drainage systems would be installed around mature trees if more than a few inches of fill must be placed over their root zones. Fill material would be the same or of a coarser texture than that formerly on the surface above the root zone.

Trees near the construction zone would also be protected by placing sturdy temporary fences at the tree driplines to prevent inadvertent operation or storage of construction equipment and materials within these sensitive zones. A professional arborist would be consulted during development of the grading plan for specific details on how to incorporate these techniques.

Operation of construction equipment would be restricted to the minimum area necessary. The five creek crossings and the three floodplain reaches would be considered sensitive areas where construction activities would be constrained within a corridor with a maximum width of 50 feet. The construction contract will contain specific provisions regarding the allowable construction corridor within these sensitive areas so that construction equipment and techniques can be designed to work within these constraints. At each of the creek crossings and along the three floodplain reaches, sturdy barriers would be placed during construction to indicate the outside perimeter of the 50-foot wide construction area.

Existing overcrossings would be replaced with undercrossings.

The existing overcrossings would be removed and replaced with undercrossings. Undercrossings will not shade vegetation or obstruct wildlife migration as do the existing

overcrossings. An undercrossing design will also free-up land surface which can be planted with vegetation. Two of the existing overcrossings would be abandoned. During removal of these overcrossings, construction activity would be likewise limited to the minimum area possible and would not disturb a corridor across the creek greater than 50 feet wide. These areas would be planted with riparian vegetation as discussed below.

Disturbed riparian corridor would be revegetated after construction with a five-year maintenance and monitoring program, and supplemental planting as necessary.

The new and abandoned creek crossings and the floodplain reaches, as indicated in Figure 17 (page 93), would be revegetated with riparian vegetation after construction. The new vegetation would consist of local native riparian trees such as willow, white alder, big leaf maple, blue elderberry, California buckeye, California bay, Fremont cottonwood and western sycamore. Three times as many replacement trees would be planted as riparian trees removed, and the minimum size planted would be one-gallon nursery size. Protective exclosures would be used to prevent grazing of young replacement trees.

Understory species would include California blackberry, honeysuckle, coyote bush, horse-tail, cattail, clotbur, ferns, sedges, and grasses. Understory plantings would provide a minimum of 25% ground coverage within the revegetation area. Cuttings and understory shrubs could be removed from the construction area before grading and replanted in the mitigation area as an alternative to nursery-raised plants.

The spacing and distribution of the new plantings would be irregular and random, not linear or geometric, to produce a natural-appearing plant community. Whenever possible, plantings would occur during the months of October, November and December to allow root establishment during the fall, a period of relative dormancy and low transpiration for plants. Watering would be provided as necessary, probably with a drip irrigation system, although regular overhead spraying and hose-soaking methods could also be used taking advantage of water truck access via the pipeline alignment. A five-year monitoring program with annual reports would be established for these riparian areas as described for the upland tree replacement program described above. Eighty percent of the riparian trees should survive the five-year monitoring period. Coverage of understory vegetation during the five-year monitoring period should be sufficient to prevent large-scale erosion

during winter rainstorms. Supplemental planting of riparian trees and understory plants would be undertaken as necessary to meet these specified goals of plant survival.

Permanent protection would be provided to the best riparian habitat along Calaveras Creek. Permanent fencing would be established around the confluence of Alameda and Calaveras Creeks and would continue along the Calaveras Creek riparian corridor upstream to the tunnel. This fencing would be designed to exclude cattle from grazing on the new vegetation during its initial period of establishment and from disturbing the existing and revegetated riparian corridor as it matures. Coordination would be made with other programs in the watershed to control feral pig damage. All efforts proposed herein to protect and replace riparian areas of Calaveras Creek will also protect and replace habitat for Foothill Yellow-legged Frog and Red-legged Frog if they are present within the project area.

Rainbow trout spawning habitat would be created in the upstream reaches of Alameda and Calaveras Creeks. In coordination with the mitigation measures on revegetation described above, spawning habitat for rainbow trout would be created with log weirs and spawning gravel. The CDFG would be consulted for appropriate locations based on stream flow and streamside vegetation, and for appropriate design.

All construction within creek channels would be conducted during the April to October dry season.

A restricted area of construction at creek crossings and floodplain stretches is required under a mitigation measure described above to protect riparian vegetation. Minimizing the removal of riparian vegetation would likewise prevent erosion of creekbanks and protect water quality in the creeks.

The Geology sections (pages 132 to 135) contain additional mitigation measures to control erosion of steep slopes and cleared areas. These measures would also minimize turbidity and sedimentation in the creek channels preserving water quality and protecting aquatic flora and fauna.

If blasting of bedrock must take place during an active nesting season (January to September) for golden eagle and prairie falcon, then alternative blasting techniques such as sequential blasting would be used which will reduce noise levels as much as possible.

Landscape vegetation between the pump station and Calaveras Road would be replaced once construction at the pump station is completed.

B. CULTURAL RESOURCES

AREA WITHIN 1,000 FEET OF CA-Ala-428/H:

Based on the previous archaeological investigations, the proximity of the proposed project alignment to a recorded archaeological site and the magnitude of the proposed project excavation, there is a possibility of the proposed project excavation activities encountering subsurface cultural resources. Therefore, the sponsor would retain the services of a qualified archaeologist. Appointment of the project archaeologist shall be subject to approval of the Environmental Review Officer (ERO) and the Director of Planning of the East Bay Regional Park District (EBRPD). The ERO would determine whether the archaeologist should instruct all excavation crews on the project site of the potential for discovery of subsurface cultural resources, and the procedures to be followed if such resources are encountered.

The archaeologist would supervise a program of on-site monitoring for the portion of the proposed project within a 1,000-foot radius of CA-Ala-428/H. The archaeologist would record observations in a permanent log. Should cultural resources of potential significance be found, the archaeologist would assess the potential significance of the find, and immediately report to the ERO. Construction excavation activities within 100 feet of the area of archaeological concern would cease. The EBRPD would be notified by the OER in a timely manner. The ERO would recommend specific mitigation measures, if warranted. At the completion of the archaeological monitoring program, the archaeologist would prepare six copies of a written report to be submitted first and directly to the ERO. The ERO would distribute individual copies of the monitoring report in a timely manner to the project sponsor and to the EBRPD.

The archaeologist would make recommendations to the ERO for final disposition of any cultural materials recovered by the archaeological mitigation program. Any cultural materials determined by the ERO to be potentially significant would be placed in an appropriate curatorial repository. The ERO may require in the case of human burial-related cultural materials that another type of disposition of such material is warranted.

In the event that any human remains are encountered within the project area during construction, California law stipulates that the Medical Examiner's Office be immediately

notified and given an opportunity to examine and evaluate the findings. In addition, the archaeologist consultant would confer with the Native American Heritage Commission to determine the proper course of action regarding contacts with representatives of the Native American community.

Copies of the draft reports prepared according to these mitigation measures would be sent first and directly to the ERO. The ERO would send copies of such reports in a timely manner to the EBRPD and project sponsor. Following approval of the report by the ERO, a final report is to be sent to the EBRPD, project sponsor and the California Archaeological Site Survey Office at California State University, Sonoma, the EBRPD and project sponsor. The Office of Environmental Review shall receive and retain three copies of the final report above and beyond the number of reports otherwise to be distributed.

THE REMAINDER OF THE PROPOSED ALIGNMENT:

The project archaeologist would instruct the project engineer of the characteristics of those subsurface cultural resources that may be encountered during project excavation/construction and the procedures to be followed if such resources are encountered. The project archaeologist would maintain a reduced monitoring program of telephone contacts and/or periodic site visits. The project archaeologist would record a permanent log of all telephone/personal contacts and observations which would be submitted to the ERO on a monthly basis.

Should cultural resources of potential significance be found, the archaeologist would assess the potential significance of the find, and immediately report to the ERO. Construction excavation activities within 100 feet of the area of archaeological concern would cease. The EBRPD would be notified by the OER in a timely manner. The ERO would recommend specific mitigation measures, if warranted. At the completion of the archaeological monitoring program, the archaeologist would prepare six copies of a written report to be submitted first and directly to the ERO. The ERO would distribute individual copies of the monitoring report in a timely manner to the project sponsor and to the EBRPD.

The archaeologist would make recommendations to the ERO for final disposition of any cultural materials recovered by the archaeological mitigation program. Any cultural

materials determined by the ERO to be potentially significant would be placed in an appropriate curatorial repository. The ERO may require in the case of human burial-related cultural materials that another type of disposition of such material is warranted.

In the event that human remains are encountered the same procedures as described above would be followed.

Copies of the draft reports prepared according to these mitigation measures would be sent first and directly to the ERO. The ERO would send copies of such reports in a timely manner to the EBRPD and project sponsor. Following approval of the report by the ERO, a final report is to be sent to the EBRPD, project sponsor and the California Archaeological Site Survey Office at California State University, Sonoma, the EBRPD and project sponsor. The Office of Environmental Review shall receive and retain three copies of the final report above and beyond the number of reports otherwise to be distributed.

C. GEOLOGY, SEISMICITY AND SOILS

A draft geologic and geotechnical study has been prepared for the proposed project which specifies general mitigation measures to be considered for potential project impacts. It recommends that future studies be prepared to more precisely evaluate some particular potential impacts and specify appropriate mitigation measures.

General mitigation schemes for unstable slopes would include rerouting the pipeline around the features or beneath the slide plane, stabilization of the slope by buttressing, dewatering of the slide mass, installation of piles or anchors, or chemical treatment of the slide plane to increase its shear strength. These measures represent the best management practices and would mitigate erosion impacts to a less-than-significant level.

Trench excavations at the stream crossings would be shored or benched to protect workers. This would completely mitigate the potential for worker death or injury. Because of the proximity of the alignment to several landslides and potentially unstable slopes, these features would be evaluated by a California Certified Engineering Geologist or California Licensed Civil Engineer as part of the geotechnical investigation for the project and their conclusions and recommendations of the geotechnical investigation would be incorporated into the design of the replacement pipeline.

The potential for fault rupture would be evaluated as a part of the geotechnical investigation, as described above, and the conclusions and recommendations of that investigation would be incorporated into the final design of the replacement pipeline. The degree to which earthquake-related impacts could be mitigated would be evaluated at that time. At a minimum, in order to accommodate deflections induced by fault rupture, the pipeline should be buried in a low-shear-strength backfill and would cross the fault at approximately a 90-degree angle.

The potential for liquefaction and lateral spreading would be evaluated as part of the geotechnical investigation, as described above, and the conclusions and recommendations of that investigation would be incorporated into the design of the replacement pipeline. Foundation design alternatives in areas where liquefiable soils are present typically include foundation/tension piles extending below the liquefiable zone. Soil densification techniques such as vibro-replacement, vibro-compaction, or dynamic consolidation are

also common. Properly implemented, the mitigation measures for soil liquefaction would completely mitigate the impact.

The potential for slope erosion would be evaluated as part of the geotechnical investigation, as described above, and the conclusions and recommendations of that investigation would be incorporated into the design of the replacement pipeline. Mitigation would employ best management practices and may include the following, as appropriate:

- o Grading of steep slopes would be kept to the minimum necessary, in order to facilitate restoration of contours and revegetation efforts. On slopes steeper than 1.5:1 the right-of-way grading would be limited to a 20- to 30-foot width wherever possible. In addition, restoration of the original contour on these slopes is often impractical because the steepness of the slope precludes compacting of soil back into the slope. Therefore, contouring the right-of-way to the existing slope after the trench has been backfilled would be considered.
- o To limit the amount of grading of cross slopes needed to create sufficient work area along the right-of-way, the work area would consist of a cut and fill pad with the trench excavated in firm soil or bedrock uphill of the daylight line in the cut. The height of the cut would be limited to 25 feet so that permanent, paved benches would not have to be constructed when the slope is restored to its original contour.
- o Steep slopes entering and exiting the active stream channel would be laid back to a gradient of 2:1 before excavation of the trench. A key at the toe of the slope would be provided to prepare the area for backfilling. Slope backfill would be placed at 90% relative compaction. The final slope inclination would be no steeper than 1.5:1 to allow for revegetation. The adjacent natural slopes would be sculpted to the fill slope and replanted.
- o Erosion control would be implemented on all disturbed areas during and immediately following completion of pipeline construction. Primary erosion control measures include revegetation and diversion of water away from graded areas using cross ditches (water bars), berms, benches and other slope erosion and runoff controls. If surface erosion control measures fail, then backfill compaction and trench plugs

would provide a secondary defense to limit gullying and/or piping as water moves down the ditch.

- o In steeply sloping terrain, primary surface erosion control would be provided by cross ditches placed at 25 foot (vertical distance) intervals on slopes greater than 3:1. The cross ditches would be constructed as a minimum one-foot deep ditch excavated into backfill or undisturbed native materials, with a minimum one-foot wide and 6-inch high berm placed on the downslope side of the ditch. The cross ditch would extend across the entire disturbed portion of the right-of-way at a typical grade of two to six percent. The ends of the cross ditch would extend into undisturbed native materials. Additional erosion control measures, including graded structures such as soil or rock dikes, berms, and contour ditches may be needed as applicable to the steepness of the site. On slopes greater than 1.5:1, many erosion control structures would prove inadequate unless specially designed. Designs for these slopes may include brow ditches, benches, or contouring of the slope to divert water away from the trench.
- o Ditch plugs or trench dams would be used to reduce erosion within the pipeline trench on steep pipeline slopes.

The installation of trench plugs supplements efforts to reduce channeling of runoff through the trench and stabilize the backfill against erosional forces. Trench plugs are designed to interrupt and redirect the flow of concentrated surface runoff and of water percolating through the trench; they are not designed to act as a buttress against the downslope movement of soil. Therefore, while the trench plugs would extend the full depth of the trench and the base and walls of the trench would be free of loose soil during installation to prevent piping beneath or around the plug, the trench plugs would not need to be keyed into the bottom or wall of the trench. Trench plugs would be constructed of fine-grained soil-filled bags, polyurethane foam, benetonite, sacked concrete or other local source material.

If the trench plugs are constructed of sacked concrete or soil filled bags, the sacks would be overlapped to increase the stability of the structure during construction. the trench plugs would be spaced at a 25- to 30-foot difference in elevation, with the first plug placed approximately 15 feet up from the toe of the slope.

- o Compaction would also be used to reduce the potential for erosion of the trench backfill. Compaction standards would be dependent on the slope inclination. These criteria would be developed during the geotechnical investigating described above and would be incorporated into the design of the replacement pipeline.

Methods for reduction of the hazard to the pipeline caused by erosion at stream crossings would include increased burial depth, encasing the pipeline in concrete, restoration of the stream crossing with riparian vegetation, restoration of the stream banks to a stable slope, and installation of debris fences or sediment basins along the banks of the stream. These measures would represent best management practices.

Based on a field reconnaissance, it does not appear that installation of bank protection, such as rip rap or gabions, would be necessary at any of the stream crossings.

An erosion and sediment transport control plan based on data obtained during the geotechnical investigation would be included in the plans and specifications for the pipeline replacement project. The erosion control plan would be reviewed by the California Department of Fish and Game; it would be designed to mitigate erosion of stream banks to a less-than-significant level.

D. VISUAL QUALITY

The mitigation measures related to tree replanting presented in the section on biology (see Section V-A, pages 123 through 128) would also mitigate visual impacts.

In addition, mitigation measures proposed as part of the project include replacement of disturbed low shrubs and grassland in the corridor using native materials to achieve a natural effect. Stream crossings would be restored to a natural state immediately following construction. Naturalistic streambanks would result from construction of the underground pipeline. Principles of the scenic corridors element as stated in the Alameda County General Plan would be followed where feasible. The project would require an action by the Alameda County Planning Commission to determine Plan conformity.

In addition, storage areas would be limited in size and screened from view by temporary fencing. Construction staging areas would be kept within the limits of the project construction corridor. Staging areas would be restored to their pre-construction appearance upon completion of construction in that area.

Transformers and switchgear associated with the proposed 21-kV line would be screened from view by metal cabinets and either wood slat fencing or chain-link/wood slat combinations. Landscaping would be used to screen the equipment from Calaveras Road, as per principles of the Scenic Routes Element of the Alameda County General Plan. Alameda County would review the proposed modifications to the plant with respect to the principles of the Scenic Routes Element which call for architectural and site design review.

Several options are presented in Section VI-D for the siting of the three-mile section of 21-kV electric distribution line from the existing 115-kV crossing to the Sunol Valley Water Treatment Plant. Each option would result in short- or long-term visual impacts to the area or the County-designated Scenic Road corridor. Each of the following options and mitigation measures are under consideration by the project sponsor. Mitigation measures for each of the options are presented below.

Option 1 -- West Side of Calaveras Road. Locate the electric distribution line such that mature trees (especially oak trees) would not be disturbed. Consider locating the line

within the abandoned telephone utility corridor on the west side of Calaveras Road. Limit the extent of the construction corridor to avoid unnecessary visual intrusion and clutter in the scenic corridor. Revegetate the construction corridor with native plantings immediately upon completion of the line. Minimize disturbance to the utility corridor during maintenance activity.

Option 2 -- Minimum 150 feet west of the centerline of Calaveras Road. Perform visual and biological field investigations to determine the most feasible location of the 21-kV line. Locate the line away from riparian vegetation, and out of view of surrounding hiking trails. Create a meandering corridor edge to diminish visual impacts of clear zones necessary for operation and maintenance of the electric distribution line.

Option 3 -- Shared Poles. Replace existing poles with poles of a greater height to accommodate 12-kV PG&E lines, telephone lines, and the proposed 21-kV line.

Option 4 -- Undergrounding. Locate the underground line such that mature trees are avoided. Limit the extent of the construction corridor. Revegetate with native grassland immediately after the line is installed or maintenance activity is performed. Visual impacts to the above-ground segment across Alameda Creek could not be mitigated.

E. TRANSPORTATION

Construction signing approaching and throughout the construction area, including at entrances to quarry operations, would be posted to include SLOW/TRUCKS (Caltrans W51).

Signs designating a 25 mph speed limit would also be posted consistent with the prima facie speed limit.

Calaveras Road traffic would be detoured onto Geary Road and then back to Calaveras Road on the winding, steep, paved connection next to the Park entrance.

The connection from Geary Road to Calaveras Road is about 0.35 mile long and its use as a regular public road was discontinued due to Alameda County's concerns relative to liability on a road which does not meet county standards. However, with appropriate signing and speed limitations the road would provide adequate traffic service during the construction period. Therefore, park traffic will be detoured via Calaveras Road to the existing connector road as described above which leads directly to the wilderness area. Drivers would be alerted by a special sign at Geary Road that the detour will have steep hills and that extra care will be required. Provisions to turn around would also be provided. Geary Road would be restricted to construction traffic only. Additional flaggers and radio control would be used where the roadway is extremely narrow and/or roadway sight distances are poor.

Construction traffic would be regulated by flagging and radio control, allowing traffic in each direction alternately.

Construction within Sunol Wilderness Area would be scheduled during the summer when park activity is very light.

Signing, barricades and detours would be placed in and around construction areas to guide and protect park traffic. Contract specifications would be written to require the contractor to coordinate with East Bay Regional Park District staff to maintain access to all recreational traffic (including vehicular, pedestrian, equestrian, bicycle, and emergency vehicles) during construction activities in Sunol Regional Wilderness Area.

Roadways, parking facilities and other infrastructure shall be restored at a minimum to their original condition. Contract specifications would be written to require the contractor to be responsible for the protection and/or replacement of pavement sections, bridges, and culverts if adversely affected by construction of the pipeline. The contractor would also be required to acquire all necessary grading and road encroachment permits from the proper County agencies.

F. NOISE

Caltrans road signs reading BLASTING/ZONE/1000 FT. and TURN OFF/2-WAY/RADIO would be installed during periods of blasting and Park personnel would be alerted to protect two-way radios. No other mitigation measures, beyond those required by federal work rules to protect worker hearing, would be required.

G. AIR QUALITY

Although the following construction mitigation measures are not strictly required to protect public health, their implementation would reduce the potential for nuisance due to dust and odors. Construction impacts on a regional level were found to be significant for NO_x emissions and PM₁₀. Implementation of the mitigation measures discussed below, for local impacts, would reduce impacts at the regional scale.

The project sponsor has agreed to reduce the potential of spot violations of the CO standards and odors from construction equipment exhaust by avoiding unnecessary idling of construction equipment. Spot checks of the construction site by the mitigation monitor would ensure the performance of this mitigation measure. The project sponsor would present evidence to the mitigation monitor of scheduled tune-ups of construction equipment with the intent to help reduce emissions. A ten percent reduction in equipment operation, achieved through the elimination of unnecessary idling of construction, combined with scheduled tune-ups of construction equipment would reduce NO_x emissions to a less than significant impact.

All construction contracts would require watering twice daily with complete site coverage; the frequency of watering would increase if wind speeds exceed 15 mph. Dust emissions related to construction would be reduced approximately 50 percent by watering exposed earth surfaces during excavation, grading and construction activities. Conditions of approval would also require daily cleanup of mud and dust carried onto road surfaces by construction vehicles. Throughout construction activities, haul trucks would use tarpaulins or other effective covers. Upon completion of construction, contractors would replant and repair as soon as possible in order to reduce wind erosion. The above mitigation measures would still result in a net increase in PM₁₀ emissions during construction. This net increase in PM₁₀ could contribute to existing 24-hour and annual exceedances of the State standards. Current mitigation measures for PM₁₀ could not reduce the impacts of the project to a less than significant level for the term of the construction period.

If soils on the site are found to be contaminated from leaks in the underground tanks the remediation plans proposed would need to follow BAAQMD regulations. Among the applicable Rules in the BAAQMD Regulation 8 are the following:

1. Rule 2, Organic Compounds, Miscellaneous Operations
2. Rule 40, Aeration of the Contaminated Soils and Removal of Underground Storage Tanks, and
3. Rule 47, Air Stripping and Soil Vapor Extraction Operations.

If aeration of the soils would last more than three months, a BAAQMD permit would be required. Under the permit requirements an Air Toxics Risk Screening Procedure may be required based on the results of a preliminary risk screening assessment conducted by the BAAQMD.

To reduce the potential impacts of an accidental spill from the diesel fuel storage tanks, the following measures would be instituted. The berm constructed around the tanks will be designed in conformance with the California Administrative Code, Title 22, Article 25, Section 67251, Design of Tanks for Permitted Facilities, to avoid the release of diesel fuel from the bermed area. As described in Title 22, Article 67145(e), Emergency Procedures, the emergency coordinator shall take all reasonable measures necessary to collect and contain releases. The above mitigation measures, in Title 22, would minimize the environmental damage.

¹ Micron is defined as one-millionth of a meter.

² The particulate emission factor was obtained from Air Quality and Urban Development, BAAQMD, November 1985, Table VI-C-2, p. VI-18.

³ U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Third Edition, August 1977, p. 11.2.4-1.

H. WATER QUALITY

The mitigation measures listed in the geology and biology sections such as: erosion control measure of diverting water away from areas to be graded and construction in creek channels being performed during the April-to-October dry season, that are designed to prevent erosion and encourage the reestablishment of streamside vegetation and protection of aquatic life would also lessen any potential impacts on water quality. No additional water quality mitigation measures would be necessary.

I. HAZARDS

The mitigation measures for unstable slopes discussed in Section V-C (page 132) would apply. In the event of a catastrophic pipeline rupture, complete mitigation would not be possible and some erosion would occur.

To mitigate the fire threat posed by construction equipment and trucks, all exhausts would be equipped with spark arresters. Each machine would also be equipped with a shovel and a fire extinguisher. In addition to this equipment, any machinery involved in welding, cutting or grinding of steel would be accompanied by a five-gallon water back pump and a dry-chemical fire extinguisher. All welding, cutting and grinding activities would be done on ground scraped down to the soil for at least a ten-foot circumference around the activity.

All portions of existing pipe which are abandoned in place would be plugged and sealed.

Interruption of public utility service will be of the shortest duration possible. Contract specification shall require the contractor to give at least 48 hours advance notice to residents prior to any planned interruption of service. For accidental disruptions, the contractor shall repair all service immediately.

VI. SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

In accordance with Section 21067 of the California Environmental Quality Act (CEQA), and with Section 15040, 15081 and 15082 of the State CEQA Guidelines, the purpose of this chapter is to identify impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the proposed project, or by other mitigation measures that could be implemented, as described in Chapter V, Mitigation Measures, pages 123 through 144.

The findings of significant impacts are subject to final determination by the City Planning Commission as part of its certification process for the EIR. This chapter in the Final EIR will be revised, if necessary, to reflect the City Planning Commission's findings.

The temporary disturbance of the upstream section of Calaveras Creek would be an unavoidable effect of construction activities in the riparian corridor. Another unavoidable impact would be the temporary emissions of nitrogen oxides (NO_x) and particulate matter (PM₁₀) from construction equipment. In addition, wildlife disturbance and fatalities would occur, as well as removal of riparian vegetation. No permanent, long-term impacts to wildlife or vegetation would occur. These impacts are discussed in Section IV-A, pages 89 through 97. A permanent adverse visual impact could occur on a County-designated Scenic Route if the proposed three-mile 21 kV transmission line is installed on 40-foot poles along Calaveras Road.

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VII. ALTERNATIVES TO THE PROPOSED PROJECT

This chapter identifies alternatives to the proposed project, discusses environmental impacts associated with each alternative, and gives the sponsor's reasons for rejection in favor of the project. Regardless of the sponsor's reasons for rejection, the City Planning Commission could approve an alternative instead of the project if the Commission believed the alternative would be more appropriate.

A. NO PROJECT ALTERNATIVE

Under this alternative the project would not be built and no changes to the existing situation would occur. If the No-Project Alternative were implemented, none of the impacts associated with the proposed project (as described in Chapter IV, Environmental Impacts, pages 89 to 122) would occur.

The environmental characteristics of this alternative would be as described in the Environmental Setting sections of this report (see Chapter III, Setting, pages 29 to 88 for a discussion of existing conditions). Wildlife and biological impacts associated with scraping, grading and trenching through vegetated terrain and associated with trenching in streambeds would not occur. The possibility of encountering significant archaeological artifacts, including human remains or burials, would be avoided. Implementation of this alternative would also preclude any slope failure or erosion which could occur as a result of pipeline construction. It would have no effect on the possibility of pipe rupture, and consequent flooding and erosion, which could occur as a result of earthquake faulting in the project area.

As stated in the project description, the existing pipeline is badly deteriorated and susceptible to rupture. Therefore, with implementation of the No Project Alternative, the current risk of rupture would remain and would increase as time goes on. A rupture would result in a rapid discharge of the upslope contents of the pipeline from the rupture point. This would entail local flooding and erosion.

No change in the existing visual quality of the project area would result from adoption of the No-Project Alternative. Existing trestled stream crossings would remain in place, rather than being removed from view. The visual integrity of the County-designated scenic corridor would be preserved because the proposed 21-kV distribution line would not be installed along Calaveras Road.

No temporary traffic delays related to construction would occur with adoption of this alternative, nor would any construction noise or air quality impacts result. No soil would be disturbed in Alameda or Calaveras Creeks, and therefore no adverse impacts would occur on the water quality or habitats of the creeks.

This alternative was rejected by the project sponsor because it would not further any of its goals. In addition to maintaining the current operating constraints which limit the San Francisco Water Department (SFWD), additional operating restrictions would occur in the future as the existing pipeline became further eroded and flow velocities had to be strictly curtailed. Therefore, if SFWD takes no action, in addition to seeing no improvement in its current operations, it will begin to see a deterioration in them.

B. ALTERNATIVE ALIGNMENT

Because Sunol Valley is quite narrow from Calaveras Reservoir to the Sunol Valley Water Treatment Plant (SVWTP), less than 500 feet in many places, there are few ways in which the proposed pipeline alignment may be varied and still be hydrologically feasible. Given the steep surrounding hillsides bordering the valley, to deviate dramatically from the proposed alignment would require pumping water up approximately 200 feet, which would entail a significant increase in energy requirements and cost. The additional hydraulic head which would build up in the pipeline as a result of the increased elevation drop would be difficult if not impossible to sufficiently dissipate.

One feasible alignment alternative considered by the project sponsor is under the roadway of Geary Road. The pipeline would be trenched under the road approximately from the confluence of Alameda and Calaveras creeks, about 3000 feet downstream of Calaveras Reservoir, to the point where Geary Road joins Calaveras Road. From here the pipeline could either be placed under Calaveras Road for the remainder of its length, or it could follow the alignment of the proposed project to its terminus at the San Antonio Pumping Station.

The pipeline under this alignment would still be subject to rupture from earthquake faulting, which could result in flooding and erosion impacts. Although some of the potentially unstable slopes involved in the proposed project alternative would be avoided, this alignment would cross an extremely unstable and steep slope. The critical portion of this slope occurs approximately one-half mile west of the entrance to Sunol Wilderness Area. For approximately 0.1 mile along this slope Geary Road narrows to one lane. The steepness of the slope will not permit two lanes of roadway, and erosion which is occurring on the downslope will eventually undermine the existing one-lane roadway. Construction under the roadway in this segment would be difficult and possibly dangerous. Natural drainage would be disturbed both during and after construction. This would cause increased surface runoff and/or saturated soil, with consequent increased erosion or slope instability. The increased erosion would result in a greater probability of a landslide, which could take out the roadway and rupture the pipeline, resulting in flooding, significant erosion, and possibly more extensive slope failure.

The extensive re-profiling which would be required to shore up the steep slope described in the previous paragraph would cause substantial disturbance to vegetation on the slope. Other than this critical section, the impacts to biological resources would be reduced along the roadway segment of this alternative. Some roadside vegetation would be removed to provide an adequate construction zone, but the zone could be narrowed where it conflicted with significant existing biological resources so as to avoid adverse impacts. Removal of the three trees discussed in Section IV-A (page 91) would still be required under this alternative. No adverse impacts would occur to cultural resources with the implementation of this alternative.

The impacts of this alternative on visual quality would be primarily the same as those described for the proposed project in Section IV-D, pages 104 through 110. If the existing trestled stream crossings were not removed as a part of this alternative, the existing visual impact they create would remain the same. The visual impacts created by their removal, i.e. temporary construction equipment and removal of some of the surrounding vegetation, would not occur.

This alternative alignment would result in greater construction impacts on local traffic than the proposed project. The stretch of Geary Road to Sunol Wilderness Area would be

blocked off during much of the construction. Traffic into Sunol Wilderness Area could be diverted via Calaveras Road to the existing connector road at the park entrance. Beyond the park, Geary Road receives only limited traffic from park personnel. Access to this portion of Geary is restricted.

Although there would be no operational noise impacts, construction of this alternative would create more noise impacts than the proposed project. Jack hammers would be required to break up the existing roadway, generating peak noise levels of 80 to 105 dBA for extended periods of time. The blasting described on page 114 for the proposed project could also be required for this alternative because the alignment segment where blasting could be required occurs before the alignment joins Geary Road. All other construction noise impacts would be the same as described for the proposed project in Section IV-F, pages 114 through 115. Air quality and water quality impacts would also both be the same as those described for the proposed project in Sections IV-G (pages 116 through 119) and IV-H (page 120), respectively.

Due to the engineering difficulties of trenching on Geary Road where it crosses particularly steep slopes, and because the project cost would be more than doubled, the project sponsor dropped this alternative from further consideration.

C. REPLACEMENT WITH 44-INCH PIPELINE

Under this alternative the existing deteriorating 44-inch pipeline would be replaced in the same alignment with new 44-inch pipe.

Impacts to wildlife and biological resources under this alternative would be the same as for the proposed project (see Section IV-A, pages 89 through 97). This is true whether the existing trestled stream crossings are replaced or whether the stream crossings are placed underground, as planned under the proposed project. However, temporary disturbance to water quality in Alameda Creek would be less if the trestled crossings were replaced than if underground crossings were constructed.

Because the existing alignment would be followed in its entirety and this area has previously been disturbed by trenching and construction activities, no impacts to cultural resources would occur with the implementation of this alternative.

The potential impacts, including flooding and erosion, resulting from pipeline rupture due to earthquake faulting could still occur if this project alternative were selected. The risk of similar impacts resulting from slope failure would be slightly greater than for the proposed project because the proposed project would avoid some of the more unstable slopes currently crossed by the Calaveras pipeline. Other geological impacts from implementation of this alternative would be the same as for the proposed project as discussed in Section IV-C, pages 101 through 103.

The impacts to visual quality would be the same as those discussed for the proposed project in Section IV-D, pages 104 through 110. However, if the pipeline was replaced on the existing trestled stream crossings, the long-term visual impact of these crossings would not be reduced, as they would be under the proposed project.

Transportation, noise, air quality, and water quality impacts of this alternative would be the same as those described in Sections IV-E, IV-F, IV-G and IV-H (pages 111 through 122) for the proposed project.

This alternative was rejected by the project sponsor because it would have most of the environmental impacts associated with the proposed project and would cost nearly as much, and it would accrue only some of the project benefits which are discussed in Section II-A, page 9.

D. CREEK TRANSFER ALTERNATIVE

This alternative would represent an expansion of the proposed project, described in Chapter II (pages 9 through 28). The purpose of this alternative would be to meet all of the Water Department's objectives discussed in the project description, as well as an additional objective of creating a sufficient flow in Alameda Creek to allow juvenile steelhead trout to migrate downstream during the spring. This would be done by making some of the transfers of water from Calaveras Reservoir to San Antonio Reservoir via the Alameda Creek channel, instead of via the Calaveras pipeline. Present practice is to make the transfer entirely by pipeline.

Sufficient stream flow to support anadromous steelhead trout fisheries in Alameda and Calaveras creeks has not existed since Calaveras Reservoir was built in 1925. Rainbow

trout populations currently exist only in isolated pools along the creeks, and these trout may be descendants of a former steelhead population, as discussed in Chapter III, page 37. California Trout, a non-profit organization representing the interests of sport fishermen and women, and the California Department of Fish and Game (CDFG) have both expressed interest in reestablishing historical steelhead trout habitat in Alameda and Calaveras creeks. The feasibility of doing so is currently being studied by an advisory committee appointed by CDFG. Initial investigations indicate that an annual 1,500 AF release between March 1 and May 15 would be adequate to restore streamflow in Alameda Creek to support steelhead fisheries. This flow would allow juvenile steelhead to migrate out to San Francisco Bay.¹

Other activities beyond the scope of the proposed project, such as the removal of barriers across downstream sections of Alameda Creek, will be necessary to reestablish a steelhead fishery. However, these additional actions would fall under the jurisdiction of the parties and are not considered under this alternative.

Under the Creek Transfer Alternative, controlled releases would be made in the spring (March 1 through May 15) from Calaveras Reservoir into the Calaveras Creek channel, which merges with Alameda Creek about one-half mile downstream. The water released into the creek would then be recaptured downstream and pumped up to the San Antonio Reservoir for storage. This water would later have to be pumped back up to the Sunol Valley Water Treatment Plant for treatment before being sent to SFWD customers via the Hetch Hetchy Aqueduct.

The other objectives of the project sponsor would still be met by construction of the 66-inch pipeline, improvements to the San Antonio Pump Station, and improvements to the outlet facilities at Calaveras Dam, all as described in the project description. This alternative, then, is an expansion of the proposed project.

The Creek Transfer Alternative cannot be defined in detail at this stage. To do so would require the completion of studies on the water-bearing strata and groundwater levels in Sunol Valley and determination of the flows in the creeks necessary to support an improved fishery. An initial analysis of a conceptual alternative can be undertaken based on available information.

To delineate how a Creek Transfer Alternative might work it is first necessary to understand the geohydrology of the Calaveras and Alameda Creek drainages. Calaveras Creek and the upper reaches of Alameda Creek are characterized by steep canyons and narrow stream channels. The alluvial deposits of gravel and silts laid down by the streams are shallow and narrow. Below the confluence of Alameda and Calaveras Creeks the slope of the stream channel decreases, its width increases, and the alluvial deposits are more extensive.

Department of Water Resources Bulletin 118-2 reports that the Sunol Valley groundwater subbasin consists of about 3,400 acres of valley floor. Water-bearing strata on the valley floor are about 100 feet thick and are recharged by surface water flows in Alameda, San Antonio, and Vallecitas Creeks. Water cannot flow out of the Sunol Valley groundwater subbasin because its downstream end is blocked by Sunol Dam, which is founded on bedrock. Groundwater is extracted from the basin at the Sunol Infiltration Galleries, where it is transferred to San Antonio Reservoir, thence to the Sunol Valley Water Treatment Plant, and finally exported via the Hetch Hetchy pipeline.

Under the Creek Transfer Alternative, as presently conceived, water would be released from Calaveras Reservoir to flow down Calaveras and Alameda Creeks and be recovered six and a half miles below the Calaveras Dam at the Sunol Infiltration Galleries. The fact that pools remain in these creeks throughout the summer upstream of the San Antonio Pump Station suggests the groundwater table is near the surface and consequently water released to the stream channel would flow in the channel rather than percolate into the groundwater. Below San Antonio Pump Station groundwater levels are depressed by dewatering activities at a number of gravel quarries. During the summer the water table is depressed about 50 feet below the adjacent stream channel. The stream bed is dry in this reach. Water pumped from the quarries is released back to the streambed downstream and collected by the Sunol Infiltration Galleries. Any water released to support fish would percolate into the streambed upstream of the quarries. Pumping by the quarries would be increased by the amount of the release. Thus, although the released water would ultimately be recovered for municipal use, the reach of the river near the quarries would remain dry and thus provide no benefit for fish. Another disadvantage is that the Creek Transfer Alternative would increase the amount of pumping the quarries need to undertake to keep their operations dry. This could make the City vulnerable to

litigation by the quarry operators. The surface mining permits on the three quarry operations in the vicinity expire in 1995, 2021, and 2045, respectively.

The Creek Transfer Alternative would have beneficial biological impacts. The additional springtime flow could be expected to enhance the condition of streamside vegetation alongside Calaveras and Alameda Creeks, and have secondary beneficial effects on other forms of wildlife such as piscivorous birds.

Geology impacts would include an increased potential for liquefaction in the event of a major earthquake. As the water table underlying the creekbed in the vicinity of the quarries rose in response to additional water flowing into the area, the loose granular soils that were previously unsaturated would become saturated, and thus susceptible to liquefaction during severe ground shaking associated with a large earthquake on the Calaveras, Hayward, or San Andreas fault.

Liquefaction results in the loss of shear strength in the liquefied soil and a loss of support for any structures founded on the soil. Severe and uncontrollable differential settlement could occur. In addition, buried structures and pipelines could become buoyant.

The Creek Transfer Alternative would produce some changes in water quality. At present during the late spring and summer months Calaveras and Alameda Creeks are reduced to isolated pools. Water temperature generally rises and dissolved oxygen content generally declines during these months within these pools. Release of water from Calaveras Reservoir in the late spring would reduce water temperature and increase dissolved oxygen content of the pools. These changes would benefit salmonid species which are adapted to cold water.

Use of the Creek Transfer Alternative would not be expected to alter the quality of San Francisco drinking water in any way.

The Creek Transfer Alternative would result in an adverse impact on energy resources. Because spring flows in Alameda Creek would be maintained through releases from Calaveras Reservoir, more water would be transferred to San Antonio Reservoir, via this method, than would normally be the case. Before water stored in San Antonio Reservoir

can be sent to SFWD customers via the Hetch Hetchy Aqueduct it must be pumped back upstream for treatment at SVWTP. Consequently, under this alternative, the water would be pumped three times to reach the treatment plant, whereas it normally arrives there from Calaveras Reservoir entirely by gravity. It would first be pumped out of gravel and sand pits by quarry operators and discharged back into the Alameda Creek channel, as described above. Then it would be pumped from Sunol Pump Station up to San Antonio Reservoir. Finally, before delivery to San Francisco, it would be suction pumped from the reservoir to San Antonio Pump Station, and from there pumped upstream to the treatment plant. Even in cases when SFWD desires to transfer water between the two reservoirs, this method would be much less efficient and much more costly and energy-intensive than the transfer method currently employed.

The Water Department has rejected this alternative from further consideration because of the environmental impacts described above, because of the high operating costs that it would entail, and in order to avoid costly lawsuits from quarry operators whose activities would be disrupted.

¹ Alameda Creek Technical Advisory Committee, Establishment of a Steelhead Fishery in Alameda Creek, May 1989.

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IX. APPENDICES

TABLE OF CONTENTS

<u>Appendix</u>	<u>Page</u>
A. INITIAL STUDY	A-2
B. COMMON, POTENTIAL AND OBSERVED WILDLIFE SPECIES IN THE PROJECT AREA	A-21
C. GEOTECHNICAL SURVEY REPORT	A-28
D. GEOLOGY MAPS - APRIL 1990	A-53

Note:

The following Initial Study, as published on January 12, 1990, is part of the public record. Many aspects of the project description and project impacts have subsequently changed. All changes are reflected in this Draft Environmental Impact Report.

CALAVERAS PIPELINE REPLACEMENT
AND ASSOCIATED IMPROVEMENTS

FINAL INITIAL STUDY
CASF NO. 89.112E

January 12, 1990

1. PROJECT DESCRIPTION

As a part of the ongoing Water System improvement program, the Water Department of the City and County of San Francisco is proposing to replace deteriorated portions of the city's water system located in the East Bay watershed. The project area is shown on Figure 1.

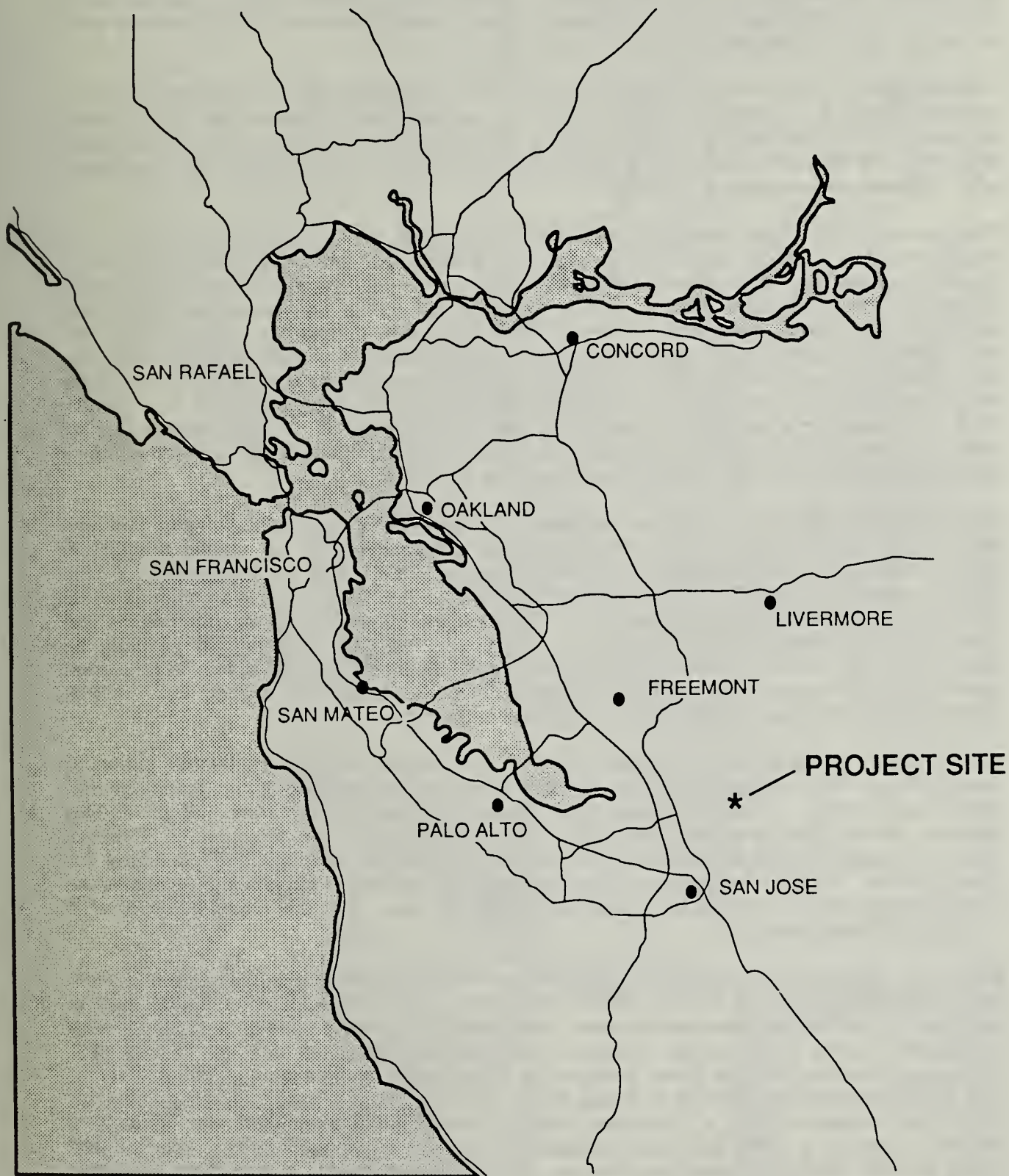
There are three major components to the proposed project: 1) replacement of the Calaveras pipeline; 2) modifications to the San Antonio Pump Station; and 3) improvements to the outlet facilities at Calaveras Reservoir. All proposed improvements would occur at the sites of the existing facilities (see Figure 2). Each component is described in greater detail below.

Replacement of Pipeline

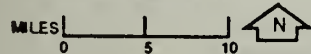
The San Francisco Water Department proposes to replace the Calaveras pipeline, which extends approximately 5.5 miles from the Calaveras Reservoir to the San Antonio Pump Station. This pipeline conveys raw water from the reservoir to the Sunol Valley Water Treatment Plant (SVWTP) for processing and then on to the San Antonio Pump Station where the water is distributed for use in the City of San Francisco. When the replacement is completed it will also be used to transfer excess reserve water from Calaveras Reservoir to the San Antonio Reservoir, thereby, conserving water which would otherwise be lost to use. In addition, the pipeline replacement can be used as an emergency backup source of water in case of an outage of the Hetch Hetchy aqueduct system.

The replacement of the existing pipeline is deemed necessary because of physical deterioration and damage to the pipeline due to erosion, slides and creekbed movement. The pipe, which was laid in 1934, is nearing the end of its useful service life. With the exception of a short pipeline segment through East Bay Regional Park District land, the project lies entirely within watershed lands owned by the City and County of San Francisco in southern Alameda County.

During the replacement, it is proposed to increase the diameter of the pipeline from 44" to 66" in order to improve the hydraulic efficiency of the pipe and to improve its capability to transfer water quickly in an emergency. The increased diameter for the pipeline is necessary to meet the potential for emergency outages in the Hetch Hetchy system, which provides over 80 percent of the potable water to the SFWD customers. In the event of a Hetch Hetchy outage, Calaveras Reservoir water would replace the lost Hetch Hetchy water. There is no planned shutdown of the Hetch Hetchy system at this time. As approximately 200,000 gallons of water are used by the City per day and the Calaveras Reservoir has a capacity of 35 billion gallons when full, taking in to account no other factors, the Calaveras Reservoir could provide the City with water for approximately 175 days. In any case, total deliveries to the San Francisco service area would not increase with this project.



SOURCE: EIP ASSOCIATES



In addition, the larger pipe diameter would improve the hydraulic efficiency of the pipe and enable the San Francisco Water Department (SFWD) to control flow velocities to 13 feet per second or less. This is desirable because velocities above this rate have been shown to result in accelerated erosion of pipe walls.

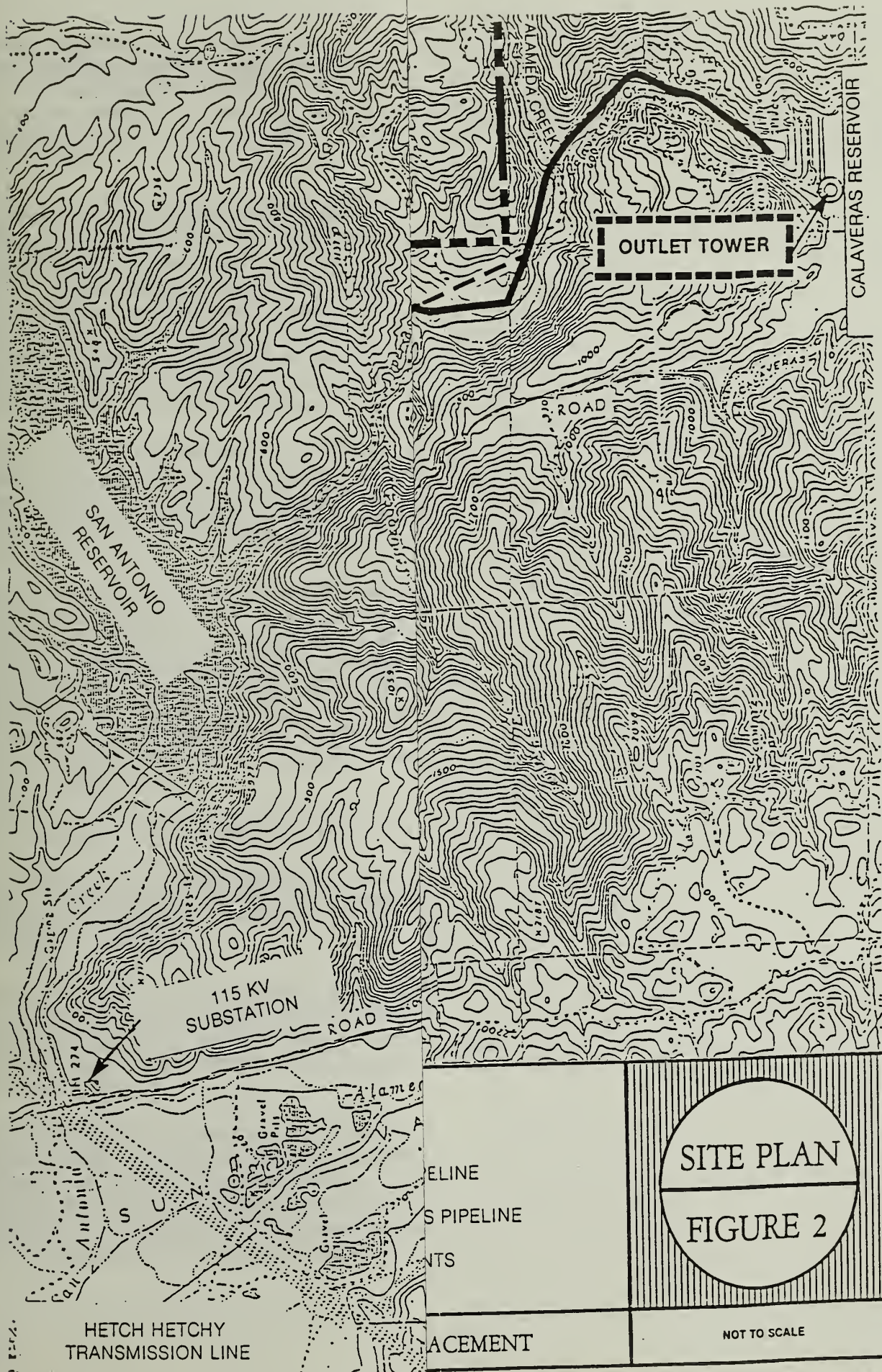
The Calaveras Pipeline Replacement Project would include undergrounding portions of the pipeline which are currently exposed and thus subject to vandalism and high routine maintenance requirements. Undergrounding the pipeline will meet some of the Water Department's project objectives of reducing maintenance and limiting public exposure, which will minimize liability to SFWD.

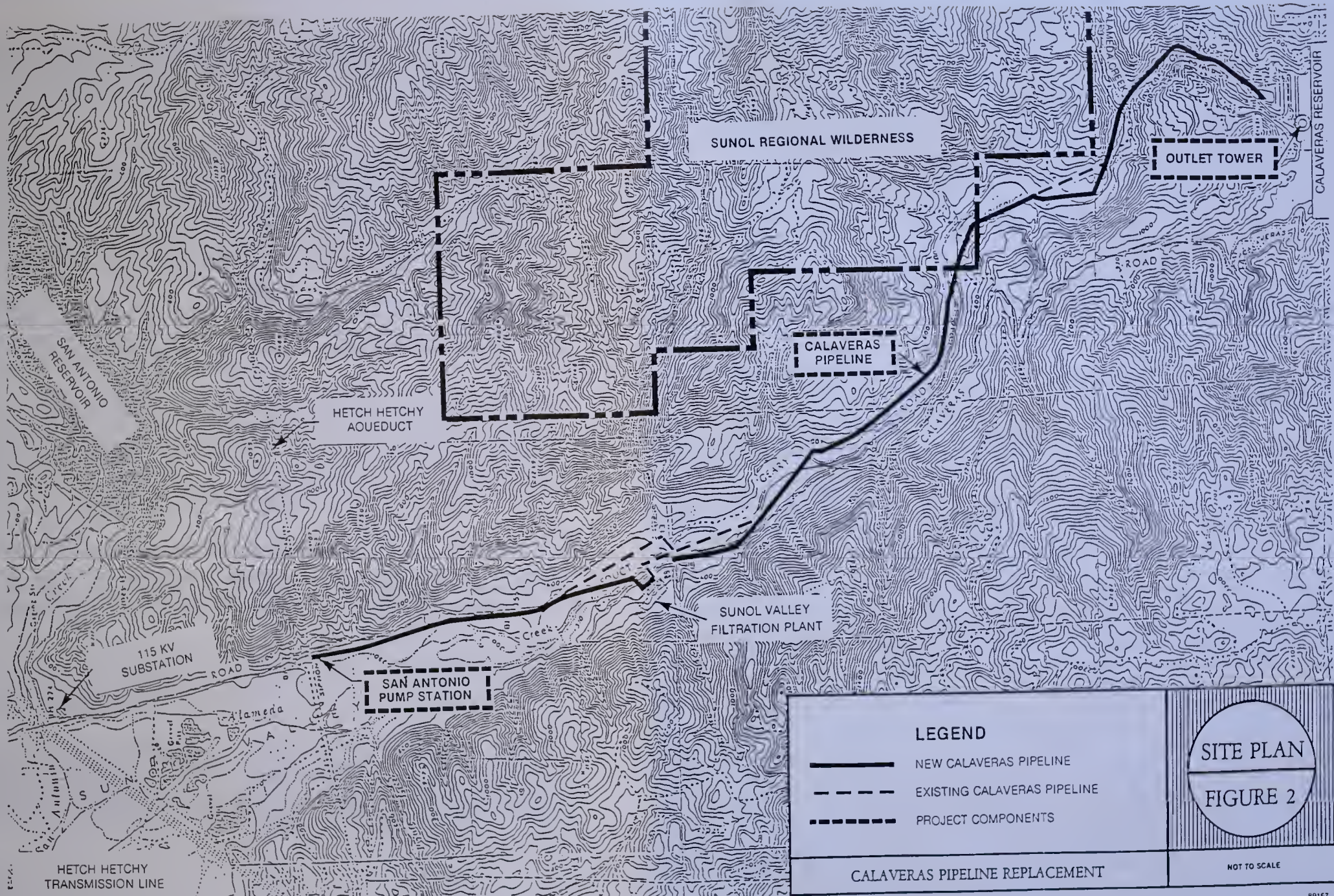
The new pipeline would generally follow the alignment of the existing pipeline. Two portions of the existing alignment, as shown on Figure 2, would be modified in order to improve access for maintenance and to avoid unstable slopes. In order to minimize visual impact of creek crossings and to attract fewer vandals, the new crossings would pass under the flow line of the creek. Five existing trestled creek crossings would be removed, with the sites rehabilitated. The only permanent alteration of terrain anticipated during the construction of the pipeline alignment would be limited expansion of the existing access roads and the creation of new access roads where the new alignment will deviate from the existing alignment. There will be modification of the topography during construction; however, after the pipeline is replaced, the ground levels will be restored and revegetated in visually sensitive areas such as the park.

For the majority of the pipeline replacement, the old pipe will not be removed. The new pipe will be laid adjacent to the existing and the old pipeline will be capped and left in place. There are two exceptions to this procedure. One will be where the existing pipeline crosses creekbeds. Currently, the old pipeline is placed on wooden trestles while the replacement will be undergrounded. With the new construction the old trestles and pipe will be removed. The second area where the existing pipeline will actually be removed will be within the East Bay Regional Park's Sunol Wilderness Area. In this area, the old pipe will be removed and the new pipe will be laid in the same trench which will be slightly enlarged to accommodate the larger diameter pipe.

The existing pipeline would continue to be operational during the initial phase of construction, when new pipeline would be laid from the San Antonio Pump Station to the Sunol Valley Water Treatment Plant, a distance of about 10,000 feet. Most of this segment of the existing pipeline would be left in place after the new pipe is installed. Phase I of construction is tentatively scheduled to begin in February 1991 and last for three months. During construction a backhoe would be used for excavation of the pipeline trench. A portable crane would be used for laying the pipe. Fill dirt would be trucked in on existing access roads.

Phases II, III and IV of construction would entail construction of pipeline segments from the Calaveras Reservoir to the water treatment plant. This would require partial drainage of the reservoir and would mean that no water deliveries would be made through the pipeline during construction. Phase II is tentatively scheduled to begin in May 1991 and is projected to require three months for completion; approximately 10,000 feet of pipe would be laid from SVWTP to Sunol Wilderness Area in this phase. During Phase III, in July and August of 1991, a 1,200-foot segment would be constructed through Sunol Park property. The final 9,000-foot segment would stretch from the park to the reservoir and would be built from approximately August 1991 to March 1992. It is in this area that blasting may have to be used in order to lay the new pipeline in bedrock excavations,





however, construction techniques have not yet been finalized. With the exception of possible blasting in phase IV, construction techniques for all phases would be basically the same with construction vehicles using existing access and maintenance roads. A construction swath of 75 feet wide will be used for all four phases of construction. At critical points and to avoid damage to natural resources, this swath can be reduced to as little as 10 feet.

Modifications to San Antonio Pump Station

Pumping capacity and reliability would be increased at the San Antonio Pump Station with the installation of three new electric pumps which will supplement the existing diesel pumps. These outdoor horizontal pumps would be located about 60 feet west of Calaveras Road. Pacific Gas and Electric (PG&E) has indicated that it would be unable to meet the consequent increased electrical demand of the pumps. The project sponsor therefore proposes to bring in power from Hetch Hetchy via a 21-kilovolt roadside transmission line. The line would extend from the 115-kV crossing at Calaveras Road to the pump station, then on to the Sunol Valley Water Treatment Plant.

This line would be strung on 30- to 40-foot high wood poles along Calaveras Road for a distance of about three miles. At each end of it and at the pumping station, conventional outdoor electrical substations, consisting of transformers and switchgear, would be constructed and surrounded by chain-link fencing. The power line and substations would be constructed entirely within SFWD property.

Improvements at San Antonio Pump Station would also include excavation and removal of two buried 9,000-gallon diesel fuel tanks and replacement with above-ground tanks. The new tanks will each have a capacity of 8,000 gallons. Storage capacity is being reduced because most of the pumping will be performed by the new electric pumps. The fuel tanks would be screened behind a redwood slat fence. In addition, a pre-fabricated shelter will be erected over the existing berm for hazardous material overflow. The existing office space would also be expanded as a part of this project. All improvements to the San Antonio Pumping Station are tentatively scheduled to be completed between December 1990 and August 1991.

Improvements to Calaveras Reservoir Outlet Facilities

The outdated and deteriorating outlet facilities of Calaveras Dam would also be replaced as a part of this project. In order to be compatible with the capacity of the new pipeline, the capacity of the Calaveras outlet works would be increased from 75 million gallons per day (MGD) to 160 MGD.

Although no exterior work would be done to the concrete outlet tower and tunnel, all of the components housed within would be replaced. This includes the outlet valves, the standpipe and pipeline, the electrical wiring and control system, and the steel platform, stairs and handrailing. Construction is tentatively scheduled to occur between May and December of 1991.

A study is currently underway to define the feasibility of increasing the outlet capacity at Calaveras Dam to allow accelerated drawdown of the reservoir in the event of an emergency. If it is feasible, the Division of Dam Safety (California Department of Water Resources) could require that the outlet works be upgraded to a capacity as high as 670 MGD in order to provide for such rapid discharge in an emergency. If such modification becomes necessary, additional environmental review could probably be required.

2. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS

A. EFFECTS FOUND TO BE POTENTIALLY SIGNIFICANT

The proposed Calaveras Pipeline Replacement Project is examined in this Initial Study to identify potential effects on the environment. Some of the effects that would be generated by the proposed project have been determined to be potentially significant and will be analyzed in an Environmental Impact Report (EIR). Other impacts would not be significant but will be included in the EIR for informational purposes. Potential significant adverse impacts which will be examined in detail in the EIR include the following:

Cultural Resources. An important archaeological site could potentially be disturbed during excavation for the portion of pipeline planned to pass through Sunol Wilderness Area, an East Bay Regional Park.

Wildlife and Biological Resources. Two plant species of concern to the East Bay Regional Park staff (valley oak and narrow-leaved milkweed) occur in the project area and could be adversely affected. The project area may also provide habitat for three special wildlife species: tricolored blackbird (Category 2 for federal listing), black-shouldered kite (California Department of Fish and Game [CDFG] fully protected), and red-legged frog (CDFG species of special concern and Category 2 for federal listing). A number of mature oak and sycamore trees would be removed. Riparian woodlands and wetland areas would be disturbed during construction.

Geology. The Calaveras pipeline is located in a seismically active region, within the effective range of five active faults capable of causing significant shaking at the site. Geotechnical impacts of construction in terms of slope instability will be analyzed in the EIR.

Visual Quality. Installation of a 21 kV power line along Calaveras Road would create potentially significant adverse visual impacts. A 60-foot wide corridor would be cleared in the pathway of the pipeline, removing riparian woodlands, including some mature trees.

Transportation. The proposed project would not generate any additional traffic. There would be an increase in truck traffic during construction which has a potential to be significant and will be discussed in the EIR.

Noise. The proposed project would not generate any operational noise. There would be an increase in noise during construction activities; this potential impact will be examined in the section on biology.

Air Quality. The proposed project would not produce an adverse effect on regional air quality. However, construction activities may cause a temporary increase in localized particulate levels which have a potential to be significant.

Water. The proposed project would not affect surface water serving as a source of public water supply, nor would it affect ground water. It would have a beneficial effect on the reliability of San Francisco's water supply. There is a potential for an effect during construction, however. Excavation of streambed crossings could result in temporary significant impacts on streamside vegetation and aquatic life; these impacts will be discussed in detail in the Biology section.

Hazards. The proposed project would not create any health hazards in the area; however, part of the construction would require the shutdown of water service; this would occur during the fire season. The EIR will analyze the impacts on enhancement of fire potential and on fire control.

B. EFFECTS FOUND NOT TO BE SIGNIFICANT

The following environmental effects would either be insignificant or mitigated to insignificant levels by measures incorporated into the project design. These require no further environmental analysis and will not be addressed in the EIR. They are discussed in more detail in Section 3B of this Initial Study.

Land Use. The proposed project would not pose any conflicts with existing land uses.

Light and Glare. The proposed project would not generate any light or glare impacts on other properties.

Population. The proposed project would not displace any residents or create any demand for housing.

Odors. Construction of the proposed project would not create objectionable odors or involve burning of any materials.

Shadows. The proposed project would not generate any shadow impacts.

Wind. The proposed project would not generate any wind impacts.

Utilities/Public Services. A 3-mile 21 kiloVolt transmission line would be constructed to convey electrical power to the San Antonio Pump Station. This would not create a significant adverse impact.

Energy. The proposed project would not result in significant increase in demand for energy resources.

3. ENVIRONMENTAL SETTING

A. COMPATIBILITY WITH EXISTING ZONING AND PLANS

	<u>Not Applicable</u>	<u>Discussed</u>
1. Discuss any variances, special authorizations, or changes proposed to the City Planning Code or Zoning Map, if applicable.	<u>X</u>	—
	<u>Not Applicable</u>	<u>Discussed</u>
*2. Discuss any conflicts with any other adopted environmental plans and goals of the City or Region, if applicable.	—	<u>X</u>

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The proposed project entails replacement and improvement of the existing infrastructure, not expansion of an existing project or creation of a new one. The project would expand water flow capacity, but it would not be an expansion in service area or in water deliveries to the existing service area. Based on verbal communications with the affected agencies, modifications to the Calaveras outlet facilities, and to the San Antonio Pump Station would occur on SFWD land and would not conflict with existing zoning or environmental plans (letters have been sent requesting written confirmation).

Portions of the pipeline pass through the Sunol Wilderness Area. Since it would be placed underground, no conflicts with park values and uses are anticipated. Access for maintenance and repairs would be via existing access roads; maintenance and use of the pipeline right-of-way would not conflict with existing or proposed park uses. The proposed project would in fact make the Calaveras Pipeline more consistent with East Bay Regional Park District's Master Plan, which requires that utility lines be underground.

The Calaveras Pipeline replacement also seems compatible with the General Plan policies of Alameda County (personal communication with Daryl Gray, Alameda County Planning Dept., November 28, 1989). The policy on a diversified regional park system specifically states:

Major park and recreation areas should also serve multiple purposes, where possible, including flood, erosion and watershed control, reservoir development and land reclamation.

There is nothing in the General Plan's Noise Element to preclude the blasting that may be required for limited stretches of bedrock excavation. Before the Final EIR can be adopted, the Alameda County Planning Commission must approve a General Plan Consistency Report on the proposed project, which will verify the projects conformity to all aspects of the General Plan. The proposed project also conforms to the existing zoning for the area, which is entirely open space or agricultural, neither of which would preclude an underground water pipeline.

B. ENVIRONMENTAL EFFECTS - Could the project:

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
1. <u>Land Use</u>			
*a. Disrupt or divide the physical arrangement of an established community?	—	<u>X</u>	<u>X</u>
b. Have any substantial impact upon the existing character of the vicinity?	—	<u>X</u>	<u>X</u>

Portions of the pipeline alignment differ somewhat from the existing pipeline, but as the pipeline would be underground, there would be no impacts on current land uses. Improvements to the San Antonio Pumping Station and the Calaveras Reservoir outlet works would occur in lands already devoted to public utility use.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

Neither construction nor operation of the new pipeline would disrupt neighboring land uses. Horseback tours of Sunol Wilderness Area are run out of an equestrian station across the road from the proposed alignment. Although these tours could potentially be disrupted by construction activities, all trips are escorted by Park personnel, and thus could be routed around or across pipeline routes. No disruptions to plant nursery leaseholders are anticipated.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
2. <u>Visual Quality</u>			
*a. Have a substantial, demonstrable negative aesthetic effect?	<u>X</u>	—	<u>X</u>
b. Substantially degrade or obstruct any scenic view or vista now observed from public areas?	<u>X</u>	—	<u>X</u>
c. Generate obtrusive light or glare substantially impacting other properties?	—	<u>X</u>	—

A corridor of approximately 75 feet in width would be cleared in the pathway of the pipeline for the trench to be dug and to allow construction vehicles room to operate. This would entail removal of riparian woodlands, oak, and some pine trees. This impact is potentially significant and will be addressed in the EIR. Construction of a 21 kV power line along Calaveras Road would also create potentially significant visual impacts.

3. <u>Population</u>			
*a. Induce substantial growth or concentration of population?	—	<u>X</u>	<u>X</u>
*b. Displace a large number of people (involving either housing or employment)?	—	<u>X</u>	<u>X</u>
c. Create a substantial demand for additional housing in San Francisco, or substantially reduce the housing supply?	—	<u>X</u>	<u>X</u>

The proposed project would not result in any increase or decrease in employment or housing, nor have any impact on the demand thereof. The increase in the size of the pipeline will allow for an emergency backup to the Hetch Hetchy system. Because of the limitations of the Calaveras Reservoir watershed, there will not be an increase of of the available water supply, which could act as an inducement to increase population. Delivery of Hetch Hetchy water occurs at the rate of 300 MGD and would not increase because the 300-MGD capacity of the Hetch Hetchy pipeline precludes delivery above this amount.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

4. Transportation/Circulation

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
*a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system?	<u> </u>	<u> X </u>	<u> X </u>
b. Interfere with existing transportation systems, causing substantial alterations to circulation patterns or major traffic hazards?	<u> X </u>	<u> </u>	<u> X </u>
c. Cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity?	<u> </u>	<u> X </u>	<u> X </u>
d. Cause a substantial increase in parking demand which cannot be accommodated by existing parking facilities?	<u> </u>	<u> X </u>	<u> X </u>

Access to the proposed pipeline occurs via Calaveras, Geary and Welch Creek Roads. All three roads are two lanes, with prima facie speed limits of 25 mph. There are nurseries and a quarry on the west side of Calaveras Road in the project area. There are no residential homes in the area.

Traffic counts performed by Alameda County were conducted on Calaveras Road at the Alameda County line and on Geary and Welch Creek Roads. The existing traffic volumes are summarized below:

<u>Location</u>	<u>Average Daily Traffic</u>	<u>AM Peak Hour Traffic</u>	<u>PM Peak Hour Traffic</u>
Calaveras Road at County Line	96	10	16
Geary Road	436	44	71
Welch Creek Road	110	11	13

The count for Geary Road, which leads to Sunol Park headquarters, was taken on a Sunday, a high-volume day for this road. The counts for Calaveras and Welch Creek Roads were taken on a weekday. The typical capacity for a rural two-lane highway is 1,800 to 2,800 passenger cars per hour.

Once the Calaveras pipeline has been replaced, virtually no changes to traffic or other transportation components would occur. During construction there would be an increase in truck traffic into and out of the traffic site. Depending on the size and

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

weight of equipment and trucks moved into and out of the project area, an Overdimensional Permit may be required by the County of Alameda for transport on unincorporated County roads, and from Caltrans for transport on State roads. Given the very low existing traffic volumes in this remote area, no significant negative impacts are expected to occur; however, the impacts will be analyzed further in the EIR.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
5. <u>Noise</u>			
*a. Increase substantially the ambient noise levels for adjoining areas?	<u>X</u>	<u> </u>	<u>X</u>
b. Violate Title 24 Noise Insulation Standards, if applicable?	<u> </u>	<u>X</u>	<u> </u>
c. Be substantially impacted by existing noise levels?	<u> </u>	<u>X</u>	<u> </u>

Upon completion of the proposed project, virtually no noise impacts would occur; therefore, noise impacts due to operation of the project will not be discussed in the EIR. Some noise would be generated during construction; there would be diesel excavators digging the trench, as well as truck traffic into and out of the area. Noise impacts on wildlife are discussed in the section on biology. Due to the remote, unpopulated nature of the project area, few humans would be affected by construction noise. Excavation in some portions of the pipeline may require blasting; noise impacts during construction of the project will be addressed in the EIR.

6. Air Quality/Climate

*a. Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation?	<u>X</u>	<u> </u>	<u>X</u>
*b. Expose sensitive receptors to substantial pollutant concentrations?	<u> </u>	<u>X</u>	<u> </u>
c. Permeate its vicinity with objectionable odors?	<u> </u>	<u>X</u>	<u> </u>
d. Alter wind, moisture or temperature (including sun shading effects) so as to substantially affect public areas, or change the climate either in the community or region?	<u> </u>	<u>X</u>	<u> </u>

Upon completion of the proposed project, virtually no air quality impacts would occur; therefore, air quality impacts due to operation of the project will not be discussed in the EIR. Construction activities would temporarily affect local air

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

quality, primarily through the introduction of particulates from the burning of fossil fuels. Total suspended particulates (TSP) would be increased from excavation and earth moving. These impacts will be addressed in the EIR.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
7. <u>Utilities/Public Services</u>			
*a. Breach published national, state or local standards relating to solid waste or litter control?	<u> </u>	<u> X </u>	<u> X </u>
*b. Extend a sewer trunk line with capacity to serve new development?	<u> </u>	<u> X </u>	<u> X </u>
c. Substantially increase demand for schools, recreation or other public facilities?	<u> </u>	<u> X </u>	<u> X </u>
d. Require major expansion of power, water, or communications facilities?	<u> </u>	<u> X </u>	<u> X </u>

The proposed project entails replacement of an existing infrastructure, not expansion of an existing project, creation of a new one, or expansion in the existing service area. The expansion would be in water flow capacity only, which would enable SFWD to handle emergency outage in the Hetch Hetchy system. Three new electric pumps will be installed at the San Antonio Pump Station to allow more efficient operation. The use of Hetch Hetchy hydroelectric power to run the electric pumps will decrease the amount of diesel fuel needed. Consequently, the project would provide no inducement to growth in the area which might increase demand for public facilities such as schools or public utilities such as water, sewage, power or communications lines. Generation of solid waste and litter would not increase as a result of the project.

8. <u>Biology</u>			
*a. Substantially affect a rare or endangered species of animal or plant, or the habitat of the species?	<u> X </u>	<u> </u>	<u> X </u>
*b. Substantially diminish habitat for fish, wildlife or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species?	<u> X </u>	<u> </u>	<u> X </u>
c. Require removal of substantial numbers of mature, scenic trees?	<u> X </u>	<u> </u>	<u> X </u>

The project area possibly provides suitable habitat for tricolored blackbirds, black-shouldered kites, and red-legged frogs, and surveys should be conducted to determine if these special species are extant. The tricolored blackbird is being considered for listing as a protected species by the U.S. Fish and Wildlife Service (FWS), but there is

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
*c. Cause substantial flooding, erosion or siltation?	<u>X</u>	<u> </u>	<u>X</u>

Water quality in the streambed would be affected during construction in a number of ways. Stream banks and channels would be disturbed during excavation for creek crossings, thus increasing siltation and turbidity. Heavy siltation can bury streamside vegetation and fish-spawning beds and smother bottom-dwelling organisms. Turbidity irritates fish gills and interferes with the photosynthesis of aquatic vegetation. Aquatic vegetation may also be disturbed or removed during excavation activities. Such removal can affect water temperature, through a loss of shading, increase erosion, and adversely affect the food and ecological niches of small aquatic organisms.

Construction of stream crossings would entail emplacement of temporary upstream coffer dams to enable the streambed at the crossing point to dry out. A trench would be dug across the streambed, pipe would be laid and buried, and stream flow would be restored. All of the above impacts will be examined more thoroughly during preparation of the EIR and in application for permits from the California Department of Fish and Game and, possibly, from the U.S. Army Corps of Engineers.

Replacement of the pipeline and the associated projects would not result in an increase in consumption of groundwater, nor would they intrude on the groundwater table or cause percolation of any pollutants. Although flows in Calaveras Creek will be altered during construction, such changes are not expected to adversely affect groundwater recharge. Therefore, groundwater resources would not be affected by the proposed project and will not be discussed in the EIR.

11. Energy/Natural Resources

*a. Encourage activities which result in the use of large amounts of fuel, water, or energy, or use these in a wasteful manner?	<u> </u>	<u>X</u>	<u>X</u>
b. Have a substantial effect on the potential use, extraction, or depletion of a natural resource?	<u> </u>	<u>X</u>	<u>X</u>

The proposed project entails replacement of an existing infrastructure, not expansion of an existing project, creation of a new one, or expansion in the existing service area. The expansion would be in water flow capacity for emergency use only. Deliveries of water to the SFWD service area would not increase, and thus no growth inducement would result from the project. Consequently, there would be virtually no effect on demand for any natural resource.

12. Hazards

- *a. Create a potential public health hazard or involve the use, production

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

The construction of the pipeline will involve truck traffic, use of backhoes, and, potentially, blasting. The EIR will contain a detailed analysis of the potential biological impacts of the construction noise of the proposed project. This will include impacts to special and endangered plant and animal species, an evaluation of habitat which will be lost as a result of construction, and measure to mitigate any potential impacts.

9. <u>Geology/Topography</u>	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
*a. Expose people or structures to major geologic hazards (slides, subsidence, erosion and liquefaction)?	<u>X</u>	<u> </u>	<u>X</u>
b. Change substantially the topography or any unique geologic or physical features of the site?	<u> </u>	<u>X</u>	<u>X</u>

The Calaveras pipeline is located in a seismically active region, within the effective range of five active faults capable of causing significant shaking at the site. These faults are the San Andreas, Hayward, Calaveras, San Gregorio and Greenville. Their maximum credible earthquakes range from Richter Magnitude 6.5 to 8.3. The proposed pipeline crosses the Calaveras Fault, which has a maximum credible earthquake of Richter 7.3 and an historic earthquake of Richter 6.7, in several places. The pipeline could potentially be ruptured during an earthquake on the Calaveras or one of the other faults; this potential will be assessed in the EIR, along with the consequences of a pipeline break for public safety and geologic stability.

Portions of some of the alternatives to the proposed pipeline route would cross landslides or unstable slopes. These potential problem areas could be avoided by burying the pipe outside the toe of the slopes involved. The potential impact of construction pads and construction roads required by the project in potentially unstable slopes will be discussed in the EIR.

Where the pipeline crosses streambeds it would be subject to erosion, which would be avoided through pipeline design features such as mortar-encased steel pipe. As the route of the pipeline would follow low-relief terrain, or at the foot of any high-relief terrain, no unique geologic or physical features would be affected by the project. Additional geologic exploration would be performed as part of the design process, with mitigation measures developed as appropriate. The primary focus on mitigation will be the development of an erosion control plan that could be the basis for construction specifications.

10. <u>Water</u>	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
*a. Substantially degrade water quality, or contaminate a public water supply?	<u> </u>	<u>X</u>	<u>X</u>
*b. Substantially degrade or deplete ground water resources, or interfere substantially with ground water recharge?	<u> </u>	<u>X</u>	<u>X</u>

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

currently insufficient evidence to warrant assignment of such status (Federal status: Category 2). The black-shouldered kite is a "fully protected" species in California Department of Fish and Game's (CDFG) rating system. CDFG rates the red-legged frog as a "species of special concern" and FWS rates it as Category 2.

The black swift, another CDFG species of special concern, is also present in the project area and may be affected by the noise from blasting (if used), as would the red-legged frog.

None of the species listed above is listed as endangered or threatened under the Federal Endangered Species Act of 1973 or the California Endangered Species Act. Under CEQA, project proponents are required to consider input from these natural resource agencies, which will be consulted as part of the EIR process.

A June 1989 field survey conducted by EIP Associates determined that the project area did not contain populations of the Alameda whip snake, which could be reasonably expected to occur in the project area. This snake is listed as threatened by CDFG and as Category 2 by FWS.

The valley oak is a plant species of concern to the California Native Plant Society and occurs in the proposed project area and could be adversely affected; therefore additional investigation will be conducted during preparation of the EIR. Some concern has been expressed by naturalists about the status of the Monarch butterfly, and a Monarch study is currently underway by CDFG. Potential project impact to both the Monarch and its host plant, the narrow-leaved milkweed, will be evaluated in the EIR. Neither of these species is classified by CDFG.

In some locations where trees grow directly adjacent to the pipeline route, tree removal would be necessary. This is particularly true where the pipeline would be rerouted into oak savannah or riparian woodland. Even trees which do not occur directly within the project areas may be adversely affected if grading, filling, or temporary stockpiling of construction materials or equipment are undertaken within their root zone. Riparian woodland is viewed by wildlife agencies as a sensitive habitat requiring special consideration. Less than 5% of the naturally occurring riparian vegetation remains intact in California.

Creek crossings by the pipeline are significant in that they may require removal of streamside vegetation and affect water quality. Since streamside vegetation controls erosion, moderates water temperature through shading, and provides ecological niches and food for small aquatic organisms, its removal could have adverse biological impacts. Degradation of water quality could occur through siltation as stream banks and channels are dug up. Siltation and turbidity of the water buries streambed vegetation and fish spawning beds, interferes with photosynthesis of aquatic vegetation, smothers bottom-dwelling organisms, and irritates fish gills. The proposed project could therefore adversely affect the proposed establishment of steelhead fisheries in Alameda Creek. This potential impact will be evaluated in the EIR.

A 1601/1603 Streambed Alteration Agreement would be required from the California Department of Fish and Game. Approval from the U.S. Army Corps of Engineers may also be required.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
or disposal of materials which pose a hazard to people or animal or plant populations in the area affected?	<u>X</u>	<u> </u>	<u>X</u>
*b. Interfere with emergency response plans or emergency evacuation plans?	<u> </u>	<u>X</u>	<u>X</u>
c. Create a potentially substantial fire hazard?	<u>X</u>	<u> </u>	<u>X</u>

No hazardous materials would be involved in the proposed project. Toxics and Safety Services of San Francisco has confirmed that there is no asbestos in the existing pipeline. Located underground, there are no components of the pipeline which could conceivably interfere with emergency response plans or emergency evacuation plans; nor would any potential fire hazard be created by the operation of the project. However, as water will be shut down for the later phases of the construction, there may be effects on fire protection during that period. This will be discussed in the EIR.

13. Cultural

*a. Disrupt or adversely affect a prehistoric or historic archaeological site or a property of historic or cultural significance to a community, ethnic or social group; or a paleontological site except as a part of a scientific study?	<u>X</u>	<u> </u>	<u>X</u>
b. Conflict with established recreational, educational, religious or scientific uses of the area?	<u> </u>	<u>X</u>	<u>X</u>
c. Conflict with the preservation of buildings subject to the provisions of Article 10 or (proposed) Article 11 of the City Planning Code?	<u> </u>	<u>X</u>	<u>X</u>

A recorded archaeological site (CA-Ala-428/H) may lie within the proposed alignment for the portion of pipeline planned to pass through Sunol Wilderness Area. This site is located near East Bay Regional Park District's park headquarters in Sunol.

An archaeological archival and surface report was prepared for the proposed project in which a second archaeological locus was identified near the park maintenance building area. It is not yet known whether this deposit is an extension of CA-Ala-428/H.

The proposed alignment will follow the existing alignment which is believed to avoid site CA-Ala-428/H. The potential impacts to cultural resources and mitigation measures to reduce or avoid such impacts will be analyzed in the EIR.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
C. OTHERS			
Require approval of permits from City Departments other than Department of City Planning or Bureau of Building Inspection or from Regional, State or Federal Agencies?	<u>X</u>	<u> </u>	<u> X </u>

A 1601/1603 Streambed Alteration Agreement would be required from the California Department of Fish and Game for the stream crossing excavations which are planned. A Section 404 permit under the Clean Water Act may be required by the U.S. Army Corps of Engineers. Truck permits would be required by Alameda County for movement of construction equipment and earth-hauling trucks.

D. MITIGATION MEASURES

- | | | | |
|--|----------|---------------|----------------------|
| 1. If any significant effects have been identified, are there ways to mitigate them? | <u>X</u> | <u> </u> | <u> X </u> |
| 2. Are all mitigation measures identified above included in the project? | <u>X</u> | <u> </u> | <u> </u> |

MITIGATION MEASURES INCLUDED AS PART OF THE PROJECT

- o An Archaeological Mitigation Program would be developed by the project sponsor in consultation with the California Native Heritage Commission and an appropriate Native American Observer, if prehistoric archaeological resources are encountered.
- o Revegetation of all cleared and excavated areas would be accomplished. Cleared areas will be revegetated with riparian species as required by California Department of Fish and Game (CDFG). Mature trees will be replaced at a ratio of 3 to 1.
- o The sites where five existing trestle stream crossings would be demolished would be rehabilitated. Requirements for obtaining CDFG's Streambed Alteration Agreement would include revegetation and water quality protection. Construction in the stream channels will be conducted during the dry season only. Silt screens, hay bales, or other techniques will be used to control downstream sedimentation as necessary. All construction activities not essential to the streambed crossings will be avoided in the stream channel and riparian corridor.

E. ALTERNATIVES

Alternatives to the proposed project to be analyzed in the EIR include the following:

- A. No Project: The existing Calaveras pipeline would continue to be used in spite of its deteriorated condition. In the event of an emergency loss of Hetch Hetchy water, Calaveras would be unable to provide additional water to maintain an adequate supply to San Francisco water customers.

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

- B. Alignment Alternatives: because the proposed project entails replacement of an existing pipeline, and due to the constraints of local topography, alternatives primarily consist of minor deviations from the existing alignment in order to avoid natural or man-made obstacles or hazards. Considered alternative alignments will be discussed in the alternatives section of the EIR.
- C. Conceptual Alternatives: Conceptual alternatives to the water pipeline will also be discussed in the EIR. These would include trucking water from Calaveras Reservoir to the Sunol Valley Water Treatment Plant and replacing the existing pipeline with another 44" pipeline within the existing alignment.

F. MANDATORY FINDINGS OF SIGNIFICANCE

	<u>Yes</u>	<u>No</u>	<u>Discussed</u>
*1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?	<u>X</u>	—	—
*2. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	—	<u>X</u>	—
*3. Does the project have possible environmental effects which are individually limited, but cumulatively considerable? (Analyze in the light of past projects, other current projects, and probable future projects.)	—	<u>X</u>	—
*4. Would the project cause substantial adverse effects on human beings, either directly or indirectly?	—	<u>X</u>	—

*Derived from State EIR Guidelines, Appendix G, normally significant effect.

G. ON THE BASIS OF THIS INITIAL STUDY:

- I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Department of City Planning.
- I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because the mitigation measures, numbers __, in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.
- X I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Barbara W. Satin

Environmental Review
Officer

for

Dean L. Macris
Director of Planning

Date: 1/10/90

APPENDIX B
PLANT AND WILDLIFE SPECIES OBSERVED, KNOWN,
OR COMMON TO THE PROJECT AREA

Common Names

Scientific Names

WILDLIFE

MAMMALS

Mule deer*	<u>Odocoileus hemionus</u>
Feral pig	<u>Sus scrofa</u>
Desert cottontail*	<u>Sylvilagus auduboni</u>
Black-tailed jack rabbit	<u>Lepus californicus</u>
Norway rat	<u>Rattus norvegicus</u>
Black rat	<u>Rattus rattus</u>
House mouse	<u>Mus musculus</u>
Western harvest mouse	<u>Reithrodontomys megalotis</u>
Deer mouse	<u>Peromyscus maniculatus</u>
California mouse	<u>Peromyscus californicus</u>
Pinon mouse	<u>Peromyscus truei</u>
Dusky-footed wood rat	<u>Neotoma fuscipes</u>
Desert wood rat	<u>Neotoma lepida</u>
California vole	<u>Microtus californicus</u>
California ground squirrel*	<u>Spermophilus beecheyi</u>
Western gray squirrel*	<u>Sciurus griseus</u>
Botta pocket gopher	<u>Thomomys bottae</u>
Bobcat	<u>Lynx rufus</u>
Cougar	<u>Felis concolor</u>
Red fox*	<u>Vulpes fulva</u>
Coyote*	<u>Canis latrans</u>
Striped skunk	<u>Mephitis mephitis</u>
Western spotted skunk	<u>Spilogale putorius</u>
Badger	<u>Taxidea taxus</u>
Long-tailed weasel	<u>Mustela frenata</u>
Raccoon*	<u>Procyon lotor</u>
California myotis	<u>Myotis californicus</u>
Big brown bat	<u>Eptesicus fuscus</u>
Silver-haired bat	<u>Lasiurus noctivagans</u>
Red bat	<u>Lasiurus borealis</u>
Hoary bat	<u>Lasiurus cinereus</u>
Long-eared bat	<u>Corynorhinus rafinesquei</u>
Pallid bat	<u>Antrozous pallidus</u>
Mexican free-tailed bat	<u>Tadarida mexicana</u>
Broad-footed mole	<u>Scapanus latimanus</u>
Opossum	<u>Didelphis virginiana</u>

BIRDS

Double-crested cormorant*	<u>Phalacrocorax auritus</u>
American coot*	<u>Fulica americana</u>
Canada goose*	<u>Branta canadensis</u>

Common Names

White pelican
 Great blue heron*
 Wood duck
 Scaup*
 Mallard*
 Gadwall
 Ring-necked duck
 Bufflehead
 Turkey vulture*
 Northern harrier
 Sharp-shinned hawk
 Cooper's hawk
 Red-tailed hawk*
 Bald eagle
 Golden eagle*
 American kestrel
 Prairie falcon
 Wild turkey
 California quail*
 Killdeer
 Greater yellowlegs
 Ring-billed gull
 Domestic pigeon
 Band-tailed pigeon
 Mourning dove*
 Common barn owl*
 Western screech owl
 Great horned owl
 Northern pygmy owl
 Common poorwill
 Vaux's swift
 White-throated swift*
 Anna's hummingbird
 Rufous hummingbird
 Allen's hummingbird
 Belted kingfisher*
 Acorn woodpecker*
 Nuttall's woodpecker
 Downy woodpecker
 Hairy woodpecker
 Northern flicker
 Olive-sided flycatcher
 Western wood-pewee
 Willow flycatcher
 Western flycatcher
 Black phoebe*
 Say's phoebe
 Ash-throated flycatcher
 Western kingbird*
 Horned lark
 Tree swallow

Scientific Names

Pelecanus erythrorhynchos
Ardea herodias
Aix sponsa
Aythya sp.
Anas platyrhynchos
Anas strepera
Aythya collaris
Bucephala albeola
Cathartes aura
Circus cyaneus
Accipiter striatus
Accipiter cooperii
Buteo jamaicensis
Haliaeetus leucocephalus
Aquila chrysaetos
Falco sparverius
Falco mexicanus
Meleagris gallopavo
Callipepla californica
Charadrius vociferus
Tringa melanoleuca
Larus delawarensis
Columba livia
Columba fasciata
Zenaida macroura
Tyto alba
Otus kennicottii
Bubo virginianus
Glaucidium gnoma
Phalaenoptilus nuttallii
Chaetura vauxi
Aeronautes saxatalis
Calypte anna
Selasphorus rufus
Selasphorus sasin
Ceryle alcyon
Melanerpes formicivorus
Picoides nuttallii
Picoides pubescens
Picoides villosus
Colaptes auratus
Contopus borealis
Contopus sordidulus
Empidonax traillii
Empidonax difficilis
Sayornis nigricans
Sayornis saya
Myiarchus cinerascens
Tyrannus verticalis
Eremophila alpestris
Tachycineta bicolor

Common Names

Violet-green swallow
 Cliff swallow*
 Barn swallow
 Northern rough-winged swallow
 Steller's jay*
 Scrub jay*
 Yellow-billed magpie*
 American crow*
 Common raven
 Chestnut-backed chickadee
 Plain titmouse
 Bushtit
 White-breasted nuthatch
 Brown creeper
 Rock wren
 Canyon wren
 Bewick's wren
 House wren
 American dipper
 Ruby-crowned kinglet*
 Western bluebird*
 Swainson's thrush
 Hermit thrush*
 American robin*
 Varied thrush*
 Wrentit
 California thrasher
 Water pipit
 Cedar waxwing
 Loggerhead shrike
 European starling
 Solitary vireo
 Hutton's vireo
 Warbling vireo
 Orange-crowned warbler
 Yellow warbler
 Yellow-rumped warbler
 Black-throated gray warbler
 Townsend's warbler
 Hermit warbler
 Western tanager
 Black-headed grosbeak
 Lazuli bunting
 Rufous-sided towhee
 Brown towhee*
 Rufous-crowned sparrow
 Chipping sparrow
 Lark sparrow
 Savannah sparrow

Scientific Names

Tachycineta thalassina
Hirundo pyrrhonota
Hirundo rustica
Stelgidopteryx serripennis
Cyanocitta stelleri
Aphelocoma coerulescens
Pica nuttallii
Corvus brachyrhynchos
Corvus corax
Parus rufescens
Parus inornatus
Psaltiriparus minimus
Sitta carolinensis
Certhia americana
Salpinctes obsoletus
Catherpes mexicanus
Thryomanes bewickii
Troglodytes aedon
Cinclus mexicanus
Regulus calendula
Sialia mexicana
Catharus ustulatus
Catharus guttatus
Turdus migratorius
Ixoreus naevius
Chamaea fasciata
Toxostoma redivivum
Anthus spinoletta
Bombycilla cedrorum
Lanius ludovicianus
Sturnus vulgaris
Vireo solitarius
Vireo huttoni
Vireo gilvus
Vermivora celata
Dendroica petechia
Dendroica coronata
Dendroica nigrescens
Dendroica townsendi
Dendroica occidentalis
Piranga ludoviciana
Pheucticus melanocephalus
Passerina amoena
Pipilo erythrophthalmus
Pipilo fuscus
Aimophila ruficeps
Spizella passerina
Chondestes grammacus
Passerculus sandwichensis

Common NamesScientific Names

Fox sparrow*
 Song sparrow
 Lincoln's sparrow
 Golden-crowned sparrow
 White-crowned sparrow
 House sparrow
 Dark-eyed junco*
 Red-winged blackbird*
 Western meadowlark*
 Brewer's blackbird
 Brown-headed cowbird
 Northern oriole
 Purple finch
 House finch*
 Pine siskin
 Lesser goldfinch
 Lawrence's goldfinch
 American goldfinch

Passerella iliaca
Melospiza melodia
Melospiza lincolnii
Zonotrichia atricapilla
Zonotrichia leucophrys
Passer domesticus
Junco hyemalis
Agelaius phoeniceus
Sturnella neglecta
Euphagus cyanocephalus
Molothrus ater
Icterus galbula
Carpodacus purpureus
Carpodacus mexicanus
Carduelis pinus
Carduelis psaltria
Carduelis lawrencei
Carduelis tristis

REPTILES AND AMPHIBIANS

Ensatina
 California newt*
 Western toad*
 Red-legged frog
 Foothill yellow-legged frog
 Pacific tree frog*
 Bullfrog
 Western fence lizard*
 Side-blotched lizard
 Coast horned lizard
 Western whiptail
 Southern alligator lizard
 Northern alligator lizard
 Ringneck snake
 Racer*
 Glossy snake
 Gopher snake
 Common kingsnake*
 Common garter snake
 Western terrestrial garter snake
 Western aquatic garter snake
 Western rattlesnake
 Western pond turtle*

Ensatina eschscholtzi
Taricha torosa
Bufo boreas
Rana aurora
Rana boylei
Hyla regilla
Rana catesbeiana
Sceloporus occidentalis
Uta stansburiana
Phrynosoma coronatum
Cnemidophorus tigris
Gerrhonotus multicarinatus
Gerrhonotus coeruleus
Diadophis punctatus
Coluber constrictor
Arizona elegans
Pituophis melanoleucus
Lampropeltis getulus
Thamnophis sirtalis
Thamnophis elegans
Thamnophis couchi
Crotalus viridis
Clemmys marmorata

FISH

Large-mouth bass
 Bluegill
 Sacramento perch

Micropterus salmoides
Lepomis macrochirus
Archoplites interruptus

Common Names

Sacramento sucker
 Channel catfish
 Blue catfish
 Brown bullhead
 White sturgeon
 Prickly sculpin
 Steelhead or Rainbow trout
 California roach

Scientific Names

Catostomus occidentalis
Ictalurus punctatus
Ictalurus furcatus
Ictalurus nebulosus
Acipenser transmontanus
Cottus asper
Salmo gairdneri
Hesperoleucus symmetricus

PLANTS

Coast live oak
 Interior live oak
 Valley oak
 Blue oak
 California black oak
 Western sycamore
 Willows
 White alder
 Lupine
 Bur clover
 Tomcat clover
 Deer weed
 Vetch
 Blue curls
 Horehound
 Hedge nettle
 Coyote mint
 Dudleya
 California blackberry
 Toyon
 Tree tobacco
 Sticky monkey flower
 Common mullein
 Buckwheat
 Scarlet pimpernel
 Madrone
 Narrow leaf milkweed
 Bindweed
 California poppy
 Filarees
 Horsetail
 Ferns
 California bay
 Wild oat
 Annual ryegrass
 Ripgut brome

Quercus agrifolia
Q. wislizenii
Q. lobata
Q. douglasii
Q. kelloggii
Platanus racemosa
Salix spp.
Alnus rhombifolia
Lupinus sp.
Medicago hispida
Trifolium tridentatum
Lotus scoparius
Vicia spp.
Trichostema lanceolatum
Marrubium vulgare
Stachys bullata
Monardella villosa
Dudleya cymosa ssp. setchellii
Rubus vitifolius
Heteromeles arbutifolia
Nicotiana glauca
Mimulus aurantiacus
Verbascum thapsis
Eriogonum sp.
Anagallis arvensis
Arbutus menziesii
Asclepias fascicularis
Convolvulus arvensis
Eschscholzia californica
Erodium spp.
Equisetum sp.
 Polypodiaceae
Umbellularia californica
Avena fatua
Lolium multiflorum
Bromus rigidus

<u>Common Names</u>	<u>Scientific Names</u>
Blue-eyed grass	<u>Sisyrinchium bellum</u>
Brodiaea	<u>Brodiaea sp.</u>
Cattail	<u>Typha sp.</u>
Mariposa lily	<u>Calochortus venustus</u>
Soap plant	<u>Chlorogalum pomeridianum</u>
Dandelion	<u>Taraxacum sp.</u>
Bristly ox tongue	<u>Picris echioides</u>
Milk thistle	<u>Silybum marianum</u>
Italian thistle	<u>Carduus pycnocephalus</u>
California sagebrush	<u>Artemisia californica</u>
Yarrow	<u>Achillea millefolium</u>
Chamomile	<u>Anthemis cotula</u>
Gum plant	<u>Grindelia procera</u>
Purple aster	<u>Aster chilensis</u>
Coyote bush	<u>Baccharis pilularis</u> var. <u>consanguines</u>
Mule ears	<u>Wyethia sp.</u>
Tarweed	<u>Hemizonia sp.</u>
Blue elderberry	<u>Sambucus caerulea</u>
Snowberry	<u>Symphoricarpos rivularis</u>
Honeysuckle	<u>Lonicera hispidula</u>
Willow herb	<u>Epilobium paniculatum</u>
Clarkia	<u>Clarkia purpurea</u> , <u>C. unguiculata</u>
Mistletoe	<u>Phorodendron flavescens</u> var. <u>villosum</u>
California buckeye	<u>Aesculus californica</u>
Big-leaf maple	<u>Acer macrophyllum</u>
Poison oak	<u>Toxicodendrum diversiloba</u>
Stinging nettle	<u>Urtica californica</u>
Black walnut	<u>Juglans hindsii</u>
Mustard	<u>Brassica sp.</u>
Cow parsnip	<u>Heracleum maximum</u>
Aleppo pine	<u>Pinus halepensis</u>
Oleander	<u>Nerium oleander</u>
Chamise	<u>Adenostema fasciculatum</u>
Acacia	<u>Acacia sp.</u>
Toyon	<u>Heteromeles arbutifolia</u>
Juniper	<u>Juniperus sp.</u>
Manzanita	<u>Arctostaphylos sp.</u>
Hare barley	<u>Hordeum leporinum</u>
Umbrella sedge	<u>Cyperus eragrostis</u>
Sticky cinquefoil	<u>Potentilla glandulosa</u>
Western yellow pine	<u>Pinus ponderosa</u>
Digger pine	<u>P. sabiniana</u>
Yellow star thistle	<u>Centaurea solstitialis</u>
Hardinggrass	<u>Phalaris tuberosa</u> var. <u>stenoptera</u>
Dock	<u>Rumex sp.</u>
Globe lily	<u>Calochortus albus</u>

Sources:

National Geographic Society, Field Guide to Birds of North America, Washington, D.C., 1988.

Stebbins, Robert C., California Amphibians and Reptiles, University of California Press, Berkeley, CA, 1972.

Jameson, E.W., Jr., and Hans J. Peeters, California Mammals, University of California Press, Berkeley, CA, 1988.

Berry, William D., and Elizabeth Berry, Mammals of the San Francisco Bay Region, University of California Press, Berkeley, CA, 1960.

Sunol Regional Wilderness Staff, Birds of Sunol Regional Wilderness and Ohlone Regional Wilderness, June 1987.

Moyle, Peter, Inland Fishes of California, University of California Press, Berkeley, CA, 1976.

Munz, Philip and David Keck, A California Flora and Supplement, University of California Press, Berkeley, CA, 1968.

Crampton, Beecher, Grasses in California, University of California Press, Berkeley, CA, 1974.

NA, Vascular Plants of Sunol Regional Wilderness, ND.

Sharsmith, Helen K., Flora of the Mount Hamilton Range of California, California Native Plant Society, Sacramento, CA, 1982.

McMinn, Howard E. and Evelyn Maino, An Illustrated Manual of Pacific Coast Trees, University of California Press, Berkeley, CA, 1935.

*Animal species observed during June and November 1989 and March 1990 field surveys. All plant species listed were observed during field surveys.

GEOTECHNICAL SURVEY REPORT

PROPOSED CALAVERAS PIPELINE

AGS Job No 51103E

FOR

UTILITIES ENGINEERING BUREAU

CITY & COUNTY OF SAN FRANCISCO

AGS, INC.

TABLE OF CONTENTS

Page No.

1. INTRODUCTION	1
1.1 GENERAL STATEMENT	1
1.2 PROJECT DESCRIPTION	1
1.3 AVAILABLE INFORMATION	1
1.4 WORK PERFORMED	2
2. FINDINGS	3
2.1 GEOLOGIC SETTING	3
2.1.1 Regional and Areal Geology	3
2.1.2 Faults and Seismicity	3
2.2 SITE GEOLOGY	4
2.2.1 Geologic Units	4
2.2.2 Faulting	7
2.3 TOPOGRAPHY	8
2.4 GROUNDWATER	8
2.5 AREAS OF POTENTIAL INSTABILITY — MITIGATIVE MEASURES	9
2.6 EXCAVATABILITY	10
3. ADDITIONAL INVESTIGATION	11
3.1 GEOLOGICAL MAPPING	11
3.2 FIELD EXPLORATION	11
3.3 LABORATORY TESTING	13
3.4 ENGINEERING ANALYSIS AND REPORT PREPARATION	13
3.5 GEOTECHNICAL DESIGN CONSULTATION	14
4. CLOSURES	15
REFERENCES	16

TABLE OF CONTENTS**TABLES**

TABLE 1	ACTIVE FAULTS
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PLATES

PLATE 1	SITE LOCATION MAP
PLATE 2	SITE PLAN
PLATE 3	REGIONAL GEOLOGY AND FAULT MAP
PLATE 4	SITE GEOLOGY AND FAULT MAP
PLATE 5	EARTHQUAKE EPICENTER MAP
PLATE 6	SPECIAL STUDY ZONES FAULT MAP

1. INTRODUCTION

1.1 GENERAL STATEMENT

This report presents the results of the preliminary geologic and geotechnical investigation performed for Calaveras Pipeline Project. The location of the project site relative to the existing highways are shown on Plate 1 - Site Location Map.

1.2 PROJECT DESCRIPTION

The City and County of San Francisco intends to replace the existing pipeline between Calaveras Reservoir and Hetch Hetchy Aqueduct, as shown on Plate 2 - Site Plan. The alignment length is about 30,000 feet. The existing pipeline, which was installed in 1934, is 44-inches in diameter and will be replaced with a 66-inch diameter pipe. The replacement pipe will generally follow the existing alignment except that an alternative alignment might be selected in places to avoid areas of slope instability and active faulting, or to improve accessibility. Alternative alignments are shown on Plate 2. At stream crossings, the new pipeline would be concrete encased and placed in a trench excavated below stream grade—in contrast to the current trestle-type crossing. The existing twin 44-inch diameter pipes between the aeration structure and the tunnel would be replaced by a single 66-inch line.

1.3 AVAILABLE INFORMATION

Information reviewed for this investigation included materials provided by Utilities Engineering Bureau, City and County of San Francisco (UEB), published areal geologic maps, and State of California Special Study Zone maps. Materials provided by UEB, in

addition to the original request for proposal attachments, included: stereo aerial photographs of the project area, maps showing alignment alternatives, copies of marked aerial photographs, a map with geologic notes of a proposed pipeline alignment (from 1915), a profile along the Calaveras pipeline (from 1939), and field notes for a pipeline alignment. The areal geologic maps and the Special Study Zone maps are listed in references.

1.4 WORK PERFORMED

Our investigation was performed in accordance with the scope of work defined in Attachment No. 1 of your letter of May 11, 1989. The work performed included:

- o A review of materials provided by UEB (described in Section 1.2) and available published maps;
- o A site visit accompanied by UEB personnel to check the proposed alternative alignments;
- o A geologic reconnaissance along the proposed alternatives, and
- o Preparation of this report.

2. FINDINGS

2.1 GEOLOGIC SETTING

2.1.1 Regional and Areal Geology. The project area is located in the northern portion of the Diablo Range which comprises the eastern portion of the Coast Ranges physiographic province. The Diablo Range consists of a series of northwest-southeast trending ridges which separate the structural trough encompassing San Francisco Bay and the Santa Clara Valley from the San Joaquin Valley. The dominant structural pattern in the Diablo Range is northwest-southeast and is exemplified by the northwest trending Calaveras Fault. The regional geology and faulting are shown on Plate 3 - Regional Geology and Fault Map.

Complexly folded and faulted Tertiary marine and non-marine formations, Cretaceous marine formations, serpentinite and Franciscan Complex comprise the Diablo Range proximate the pipeline. Quaternary surficial deposits include older and Holocene alluviums and landslide deposits. The areal geology and drainage pattern reflect the regional structural pattern. The pipeline roughly follows the drainage of Alameda Creek and its tributary, Calaveras Creek, which have developed along the northwest trending Calaveras Fault. The geology near the site is shown on Plate 4 - Site Geology and Fault Map.

2.1.2 Faults and Seismicity. The project area is located in a seismically active region which has been subjected to several strong earthquakes during historic time. Epicenters for recorded earthquakes greater than magnitude 2.5 are shown on Plate 5 - Earthquake Epicenter Map.

Major active faults which could cause significant shaking at the site are the San Andreas, Calaveras, Hayward, San Gregorio and Greenville faults. Other active faults are in the region but are either further

from the site or not as capable of generating an earthquake strong enough to cause significant shaking at the site. The proximity of major active faults to the site and their historic and maximum credible earthquakes are listed in Table 1.

TABLE 1
ACTIVE FAULTS

<u>Fault</u>	<u>Distance to the site (miles)</u>	<u>Fault Length (miles)</u>	<u>Maximum Richter Magnitude (assigned)</u>	<u>Maximum Richter Magnitude (historic)</u>
San Andreas	22	745	8.3	8.3
Hayward	4	45	7.3	6.7
Calaveras	0-0.5	71	7.3	6.7
San Gregorio	34	84	7.5	6.1
Greenville	18	34	6.5	5.5

2.2 SITE GEOLOGY

The site geology description is based upon a review of existing geologic maps and a geologic reconnaissance along the alignment. The primary purpose of the reconnaissance was to identify areas of instability and potential fault traces. Geologic units and faulting which are anticipated along the various alignments are described below.

2.2.1 Geologic Units

Serpentinite and Franciscan Complex. Rocks of the Franciscan Complex and serpentinite occur along the pipeline alignment between the aerator structure and the confluence of Calaveras and Alameda Creeks. Franciscan rock types include very hard, very strong

glaucophane schist; sandstone, which varies from hard and strong to having low hardness and weak, and greenstone, which is hard but of variable strength. Serpentinite, which is associated with the Franciscan Complex, is commonly crushed and weak but can also occur as hard, strong masses.

The Franciscan rocks crop out in the stream bed along Calaveras Creek. Elsewhere along the creek, we believe the Franciscan to be covered with a variable, but unknown thicknesses of surficial deposits including very coarse stream channel deposits and landslide deposits.

Cretaceous Marine Shale (Panoche Formation). Panoche Formation occurs along the southwest side of the Calaveras Fault in the project area and consists predominantly of shale with interbedded sandstone and siltstone. The shale is moderately indurated, and the sandstone is moderately well cemented. The bedding strikes northwesterly and dips at a low (25° - 40°) angle to the southwest, i.e. into the ridge flanking Alameda Creek on the southwest.

The southwesternmost pipeline alignment alternative, on the southwest side of Alameda Creek between the access road to the filtration plant and Geary Road, could encounter Panoche Formation. The Panoche Formation is exposed in cuts below the filtration plant and may underlie a shallow cover of the alluvium up- and down-line from the filtration plant area.

Tertiary Marine Sediments. Tertiary marine sediments--shale, sandstone, and siltstone--occur northeast of the Calaveras Fault in the project area. The shale and siltstone are poorly to moderately indurated. The sandstone is moderately cemented and locally fossiliferous. Bedding generally strikes northwesterly; dips are controlled by the northwest-southeast trending syncline which transects the project area.

The Tertiary marine sediments are exposed on the northeast side of Alameda Creek and along or near the various alignment alternatives from near Welch Creek to the confluence of Alameda Creek with Calaveras Creek. The marine sediments are overlain by a varying and presently unknown thicknesses of alluvial and landslide deposits.

Older Alluvium. Older alluvial deposits have been mapped along the east side of Alameda Creek opposite the regional park campground and on the west side of Alameda Creek at the filtration plant. The older alluviums, which comprise terraces, consist of sand, gravel, and fines.

Alignment alternatives would encounter the older alluvium south of the regional park campground. The older alluvium at the filtration plant could be encountered by the southwesternmost alternative in that area.

Alluvial Deposits. Active stream channel deposits and alluvium were mapped (Dibblee, 1972) along Calaveras and Alameda Creek. The active stream channel deposits (map symbol Qg) consist of sand, gravel, and coarser detritus including boulders as much as 10-feet in maximum dimension in Calaveras Creek. Alluvium outside the currently active stream channel (map symbol Qa) includes flood plain, alluvial fan, and colluvial deposits and was mapped adjacent Alameda Creek downstream from about 4,000 feet upstream of Welch Creek and at the regional park headquarters area. The alluvium (Qa) consists of sand, gravel and coarser detritus with some fines.

Alignment alternatives would encounter alluvial deposits along and adjacent Calaveras and Alameda Creeks. Particularly coarse deposits would be encountered along Calaveras Creek downstream of the tunnel.

Landslide Deposits. Landslide deposits have been mapped locally above portions of Calaveras Creek, above Alameda Creek, and above the alluvial flats at the regional park headquarters area. The alignment alternative following the existing alignment northeast of Alameda Creek from about 3,500 feet upstream of Welch Creek to opposite the regional park campground would cross a mapped slide. The other alignment alternative in that same reach, i.e., the alignment at or near the base of the slope, would be below or outside the toe of the slide area. The pipeline would be near the toe of a mapped landslide upstream of the tunnel and would cross a mapped slide near below the peak point of the pipeline along "highway 1". The landslide deposits could include both greatly disturbed chaotic debris and blocks of detached bedrock.

2.2.2 Faulting. The active Calaveras Fault is the dominant structural feature in the project area and is included in a State of California Special Study Zone (CDMG, 1982). The pipeline alternatives are within the Special Study Zone for the Calaveras Fault from the stream crossing at the north end of the regional park campground to the project terminus at the Hetch Hetchy Aqueduct, as shown on Plate 6 - Special Study Zones Fault Map. Proposed pipeline alternatives follow or closely parallel traces or concealed traces of the fault, and there are several potential fault crossings.

The pipeline could cross one to three traces of the fault on the north side of Alameda Creek opposite the regional park campground, and perhaps one or two traces near the stream crossing about 4,000 feet downstream. The northeasternmost alignment alternative near Welch Creek could cross one trace of the fault in the flat just southeast of Welch Creek.

The pipeline would appear to follow a concealed trace of the Calaveras from Welch Road to the project terminus. Also, the most northeasterly pipeline alternative i.e., the alternative parallel to the existing line northeast of Alameda Creek some 3,500 to 5,500 feet southeast of Welch Creek, would appear to follow a possible fault trace in that area.

2.3 TOPOGRAPHY

The topography transversed by the proposed pipeline varies from rugged to gentle. Between the aeration structure below Calaveras Dam and the confluence of Calaveras and Alameda Creeks, the topography is rugged, slopes are steep, and relief is great. However for much of this reach, the pipeline is at or near the base of the canyon wall mitigating the terrain effect. A notable exception is where the pipeline climbs to its peak point along "highway 1".

Between the Calaveras and Alameda Creek confluence and Welch Creek the terrain is less rugged, and relief along the alignment alternatives is less. Short steep slopes occur locally.

From Welch Creek to the pipeline terminus, the terrain is gentle, and relief is low. Low, but steep banks would be traversed by the southeasternmost alternative where it climbs out of the Alameda Creek channel.

2.4 GROUNDWATER

We anticipate that groundwater will be encountered at stream crossings and in excavations in the alluvial deposits near stream grade. However, because of the faulting and complex geology, groundwater could be encountered elsewhere along the pipeline.

2.5 AREAS OF POTENTIAL INSTABILITY — MITIGATIVE MEASURES

Potentially unstable areas include existing areas of instability (see Section 2.1.1) and certain other steep areas in weak formations. Mitigative measures could include avoidance, i.e., go around the unstable area where possible, and stabilization of the slopes. In some locations, burial of the pipeline outside the toe of the slide at the base of a steep slope could protect the pipeline from slope movement or falling rock. Unstable and potentially unstable areas along the proposed pipeline and mitigative measures, based only on our preliminary investigation, include::

- o The mapped landslide and adjoining steep slope upstream of the tunnel-bury pipe outside toe of slope;
- o The mapped, and active, landslide at the pipeline peak point on "highway 1"—stabilize toe of slope to protect against undercutting of slope by stream;
- o The mapped landslides on the right side, i.e., the north and northeast side, of Alameda Creek opposite and downstream of the regional park campground—locate pipeline along alluvial flat, cross creek to avoid the largest of this group; and
- o The steep slope along Geary Road opposite the mapped landslides on the north and northwest sides of Alameda Creek—avoid routing pipeline in this area.

2.6 EXCAVATABILITY

Excavatability (relative ease or difficulty of excavation) of the pipeline trench or for other structures will vary from difficult to easy. Difficult excavation is anticipated locally along the pipeline between the aeration structure and the Alameda Creek - Calaveras Creek confluence. Hard, shallow bedrock and hard, large boulders occur in this reach, and some blasting will be necessary to break the rock for excavation. From the Alameda Creek-Calaveras Creek confluence to Welch Creek, excavation will probably not require significant blasting to remove bedrock, although large boulders may have to be broken by blasting so they can be excavated. Bedrock could require moderate ripping effort. Bedrock could be encountered in stream crossings at the confluence and upstream and downstream of the regional park headquarters picnic and camping areas.

From Welch Creek to the pipeline terminus, the excavation is expected to be in alluvial deposits, except that the southwesternmost alternative will encounter bedrock in the reach below the filtration plant. Bedrock is not expected to be encountered in the stream crossings in this reach.

3. ADDITIONAL INVESTIGATION

The work performed for this study is preliminary in nature. This work was performed to compile and review the existing geologic and geotechnical information and provide the preliminary findings and conclusions presented in previous sections. Additional geologic mapping, field exploration, laboratory testing, and engineering analyses will be required to develop final geotechnical conclusions and recommendations. Our recommended scope of work is presented in the following paragraphs.

3.1 GEOLOGICAL MAPPING

A map of the geology along the proposed pipeline shall be made at a scale of 1 inch equals 100 feet (1:1,200). The map shall include:

- o Geologic units and other features;
- o Faults and active faults;
- o Proposed pipeline alignment;
- o Areas where rock excavation may be anticipated;
- o Areas where hard ripping may be anticipated;
- o Areas where landslide or land instability may be anticipated;
- o Areas where high groundwater may be anticipated.

3.2 FIELD EXPLORATION

Borings. An adequate number of test borings shall be made to define the subsurface conditions. Borings shall be spaced not farther than 1,000 feet apart along the alignment and shall also be located in areas where there is anticipated variation in

subsurface conditions and in areas of potentially unstable ground. The borings shall be drilled at least 10 feet below the bottom of trench excavation or at least 10 feet into firm soils, whichever is deeper. Standard Penetration Tests (SPT), Pitcher, Modified California, Shelby and bulk and core samples shall be taken as appropriate for the various types of subsurface material encountered. Soil samples shall be taken every 5 feet. Depth to groundwater shall be measured whenever it is encountered. Piezometers shall be installed at selected locations to monitor groundwater level. All other borings shall be backfilled with excavated material.

Seismic Survey. Seismic refraction surveys shall be performed at selected locations where bedrock may be encountered at shallow depths. The objective of the seismic survey data is to obtain seismic velocities in the various material layers to estimate the depth to bedrock rippability.

Test Pits. In areas not accessible to drilling rigs, backhoe test pits may be excavated. All test pits shall be backfilled after logging and sampling.

Fault Trenching. At locations where the pipeline crosses suspected or mapped traces of the Calaveras Fault, trenches shall be excavated. The number of trenches, their length and depth must be sufficient to determine the existence, or satisfy the absence of faulting.

The trenches shall be shored where required by safety standards or if otherwise deemed necessary, and shall be logged by, or under the direct supervision of, a Certified Engineering Geologist to assess the presence or absence of faulting.

3.3 LABORATORY TESTING

Laboratory testing program shall be made to evaluate classification, gradation, and other pertinent parameters of subsurface materials. Moisture content, dry density, Atterberg limits, shear strength, sieve and wash analyses, consolidation, compaction and corrosivity tests shall be performed as appropriate for the types of materials encountered.

3.4 ENGINEERING ANALYSIS AND REPORT PREPARATION

Based upon the results of the field exploration and laboratory testing programs, engineering analyses shall be performed so as to develop the required geotechnical conclusions and recommendations for the project design and construction. A geotechnical report shall be prepared and will include all geotechnical data, field exploration and laboratory testing results, findings, conclusions and recommendations addressing the following:

- o Geologic and seismic hazards including surface faulting, ground shaking, liquefaction, settlement, seismically induced strain;
- o Seismic design criteria, risk analyses, seismically induced lateral earth pressure;
- o Rupture hazard mitigation measures for pipeline fault crossings;
- o Landslide potential evaluation;
- o Recommendations for landslide mitigation measures including pipeline route alteration, surface drainage, subsurface drainage, and earth retaining structures;
- o Rock rippability and excavation methods;
- o Dewatering characteristics of underlying soil and rock;
- o Shoring design parameters;

- o Earthwork specification including pipe bedding, trench width, and trench backfills;
- o Anticipated differential settlements;
- o Pipe foundation recommendations;
- o Vertical and horizontal earth pressures on pipelines;
- o Recommendations for trust block design; and
- o Recommendations for construction monitoring.

Five copies of draft report shall be submitted for review and comments. Ten copies of the final report shall be submitted after incorporating the review comments.

3.5 GEOTECHNICAL DESIGN CONSULTATIONS

Geotechnical design consultation will be provided by principal engineers and/or engineering geologists as needed.

4. CLOSURES

The findings and conclusions presented in this report are preliminary and based upon our geologic reconnaissance and the existing geologic data. Additional investigation should be conducted to develop final geologic and geotechnical conclusions and recommendations for the subject project.

This report was prepared for the exclusive use of Utilities Engineering Bureau, City and County of San Francisco. The findings and professional opinions presented in this report are within the limits prescribed by the client and were prepared in accordance with generally accepted professional engineering and geologic practice. There is no other warranty either expressed or implied.

Respectfully submitted,

AGS, Inc.

Ernest Solomon / BK
Ernest Solomon
C.E.G. 350

Bahram Khamenehpour
Bahram Khamenehpour, Ph.D.
R.C.E. 39660

REFERENCES

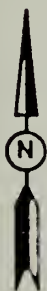
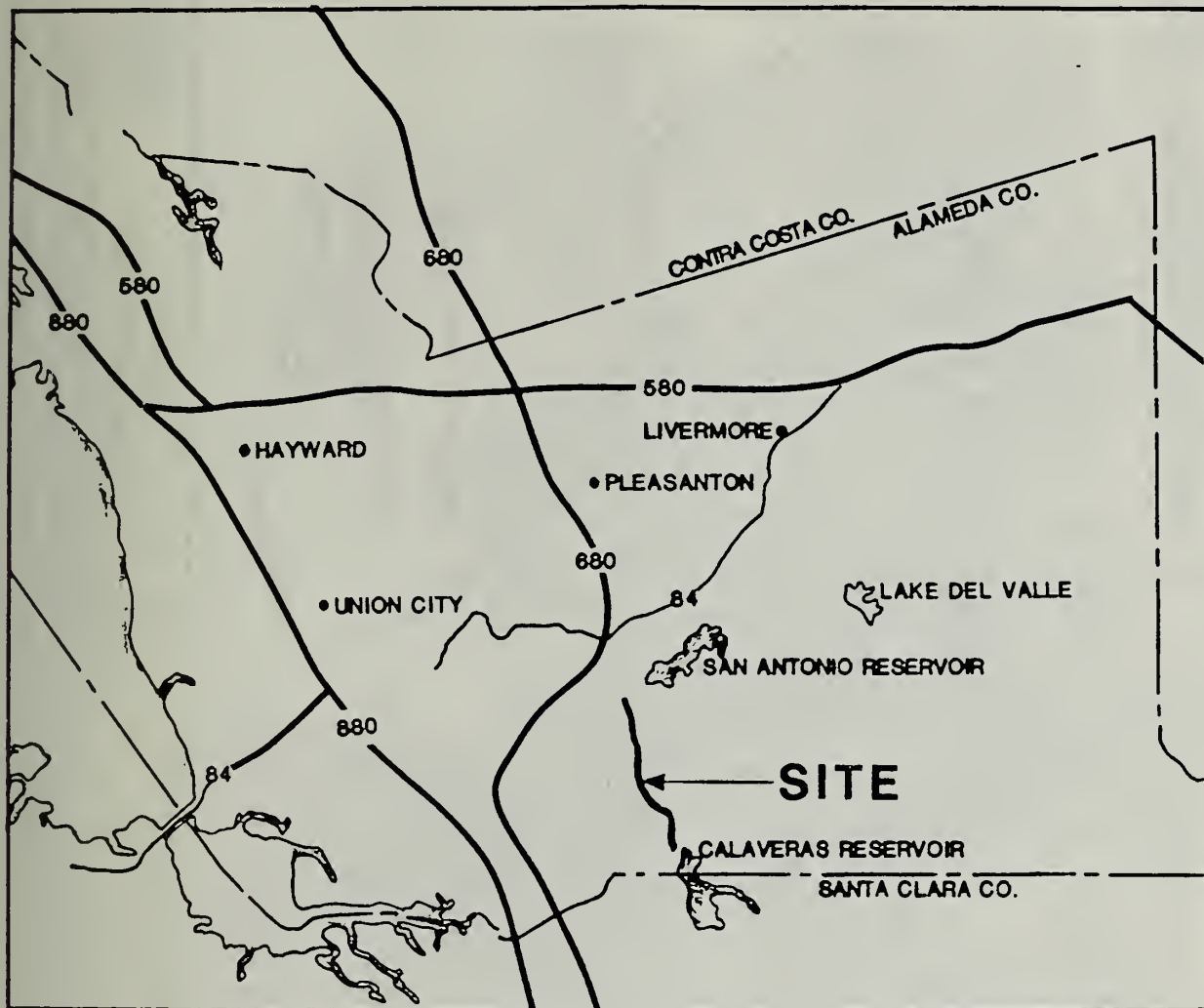
Aerial Photos; (1989); Series 3990-3996, 4169-4178, 4004-4009, 4025-2046, 4031-4032, 4136-4139; Copies provided by UEB.

California Division of Mines and Geology; (1982), Calaveras Reservoir, Special Studies Official Map; Scale 1: 24,000.

_____; (1982), La Costa Valley of Special Study Zones, Official Map; Scale 1: 24,000.

Dibblee, T.W.,; (1972), Calaveras Reservoir Quadrangle; Open File Map 73-58, Scale 1:24,000.

_____; (1980), La Costa Valley Quadrangle; Open-file Report 80-533A, Scale 1:24,000.



0 5 10
SCALE MILE

SITE LOCATION MAP PROPOSED CALAVERAS PIPELINE		AGS, Inc. CONSULTING GEOTECHNICAL STRUCTURAL AND CIVIL ENGINEERS
JOB NO. : SF51103E	DATE : 6/89	PLATE 1

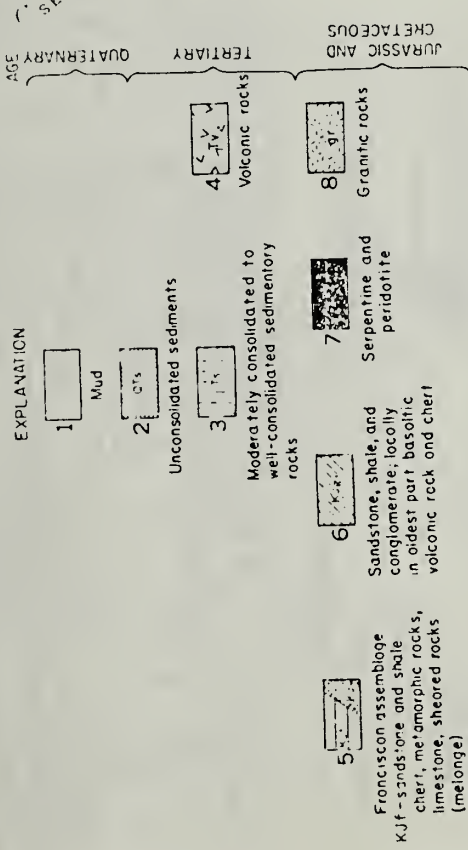
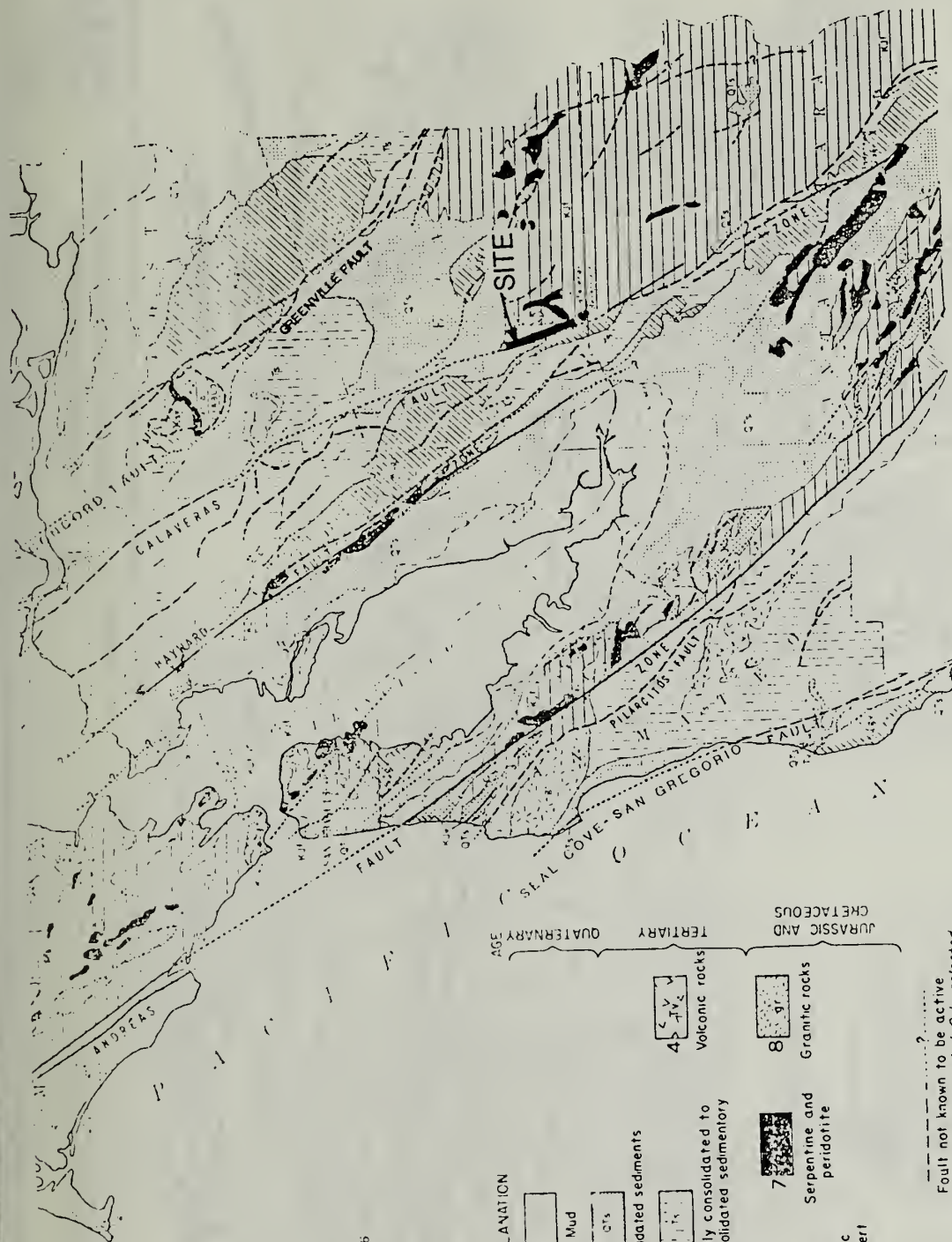


REFERENCE: USGS 7.5 Minute Topographic Map,
 Calaveras Reservoir Quadrangle, 1961,
 Photorevised 1980
 USGS 7.5 Minute Topographic Map,
 La Costa Valley Quadrangle, 1960,
 Photorevised 1980

LEGEND:

--- PROPOSED PIPELINE
 --- ALIGNMENT ALTERNATIVES

AGS, Inc. CONSULTING GEOTECHNICAL ENGINEERS AND CIVIL ENGINEERS	SITE PLAN PROPOSED CALAVERAS PIPELINE
JOB NO. : SF51103E	DATE : 7/89
PLATE 2	



--- Fault known to be active
 - - - Fault where concealed
 - - - Fault not known to be active
 - - - Fault where concealed
 - - - Faults shown. Query indicates uncertainty as to existence of fault

REGIONAL GEOLOGY AND FAULT MAP PROPOSED CALAVERAS PIPELINE

AGS, Inc.
 CONSULTING GEOTECHNICAL
 STRUCTURAL AND
 CIVIL ENGINEERS

JOB NO. : SF51103E	DATE : 7/89	PLATE 3
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LEGEND:

GEOLOGIC SYMBOLS

- CONTACT, DASHED WHERE GRACIATION OR APPROXIMATELY LOCATED
- FAULT, DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED, COVERED WHERE UNCERTAIN
- SANDSTONE BED



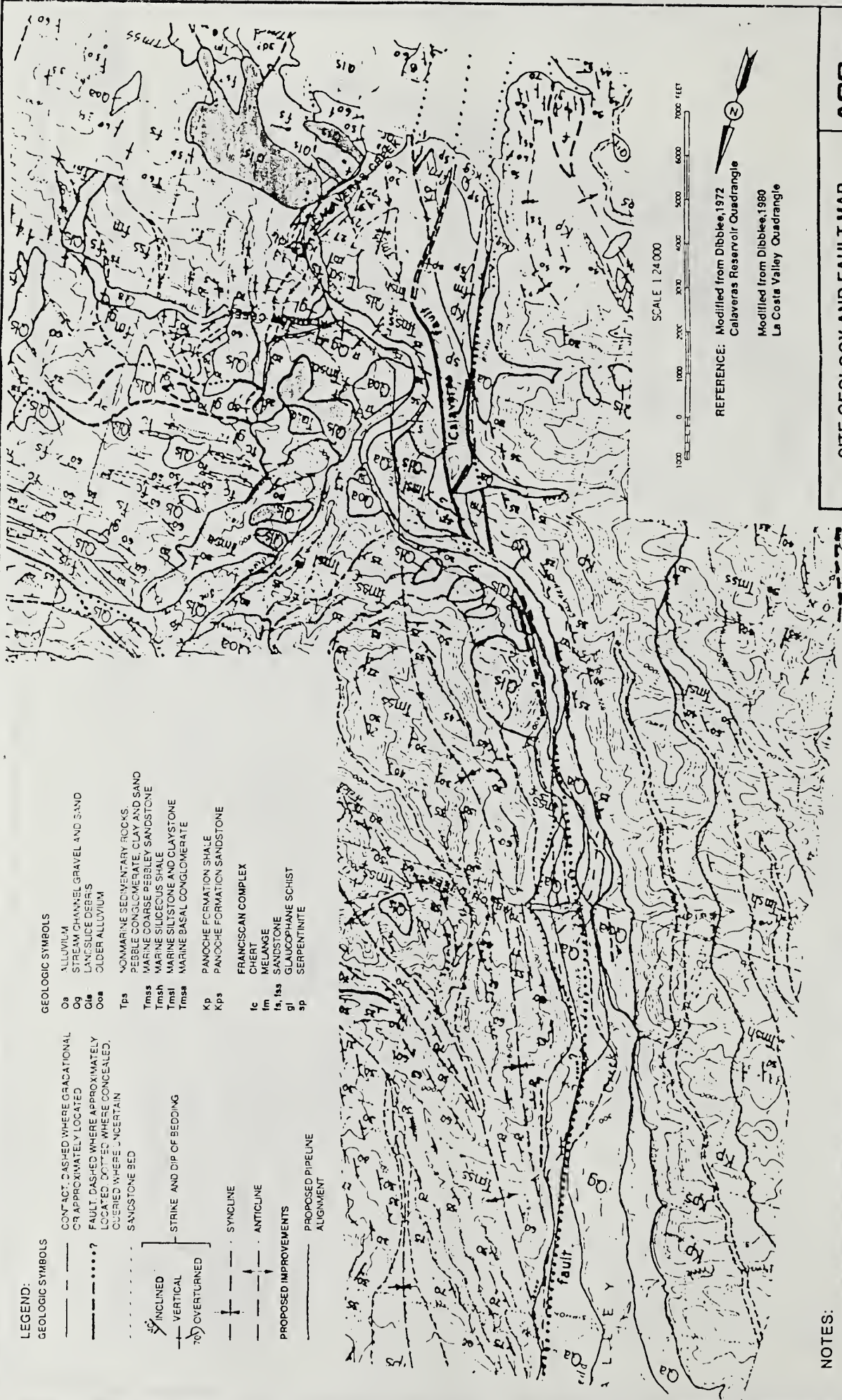
- SYNCLINE
- ANTICLINE

PROPOSED IMPROVEMENTS

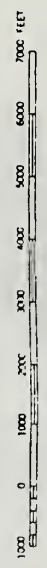
- PROPOSED PIPELINE ALIGNMENT

GEOLOGIC SYMBOLS

- Qa ALLUVIUM
- Qg STREAM CHANNEL GRAVEL AND SAND
- Qls LANDSLIDE DEBRIS
- Qos OLDER ALLUVIUM
- Tps NONMARINE SEDIMENTARY ROCKS
- Tmsa PEBBLE CONGLOMERATE, CLAY AND SAND
- Tmsh MARINE COARSE PEBBLE SANDSTONE
- Tmsl MARINE SILTCEOUS SHALE
- Tmsa MARINE SILTSTONE AND CLAYSTONE
- Tmsa MARINE BASAL CONGLOMERATE
- Kp PANOCHE FORMATION SHALE
- Kps PANOCHE FORMATION SANDSTONE
- fc FRANCISCAN COMPLEX
- fm MELANGE
- fs, lss SANDSTONE
- gl GLAUCOPHANE SCHIST
- sp SERPENTINITE



SCALE 1:24,000



REFERENCE: Modified from Dibble, 1972
Calaveras Reservoir Quadrangle
Modified from Dibble, 1980
La Costa Valley Quadrangle



NOTES:

MAP MODIFIED FROM: DIBBLE, 1980, LA COSTA VALLEY QUADRANGLE
DIBBLE, 1972, CALAVERAS RESERVOIR QUADRANGLE

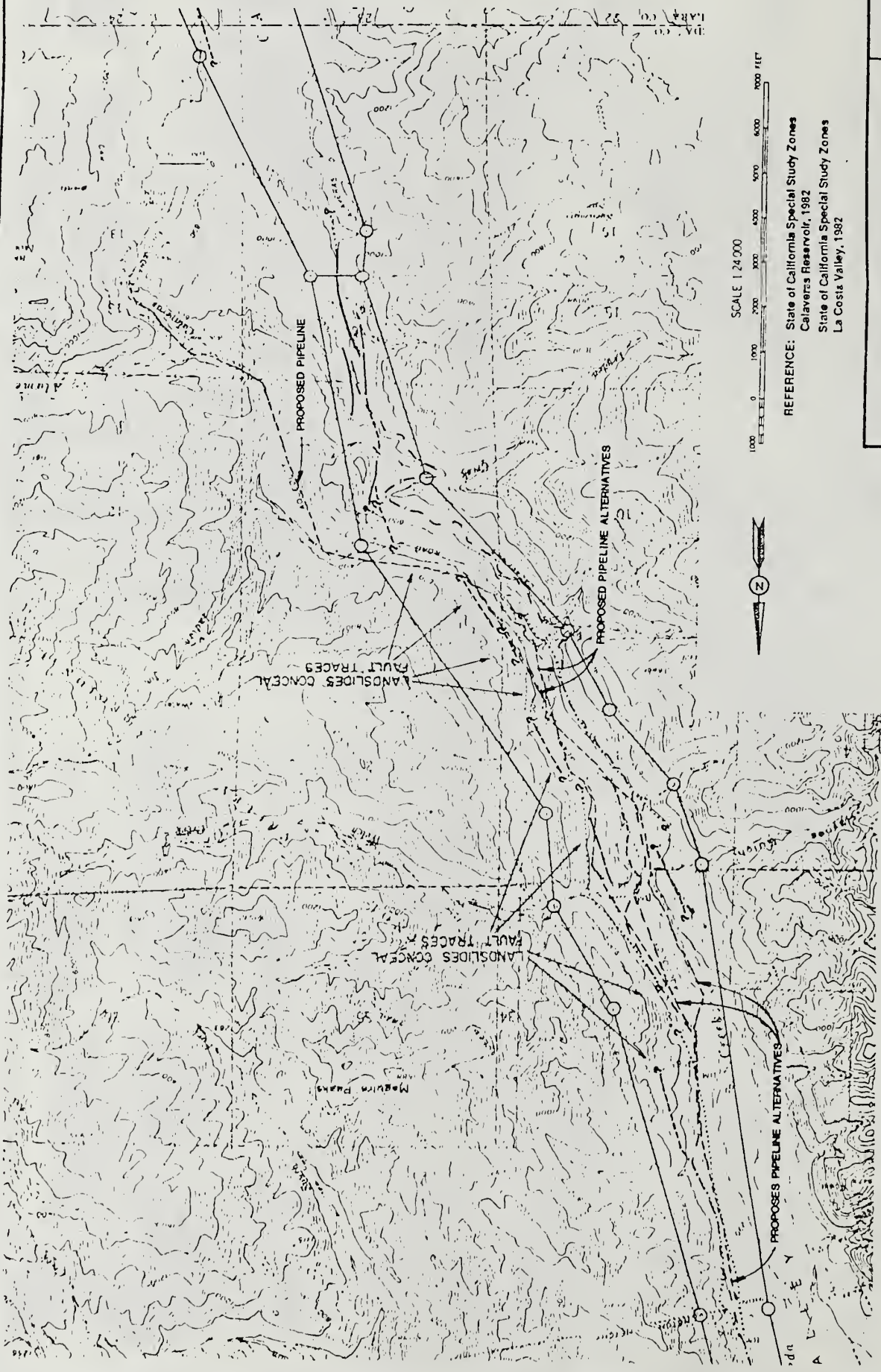
SITE GEOLOGY AND FAULT MAP
PROPOSED CALAVERAS PIPELINE

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STRUCTURAL AND
CIVIL ENGINEERS

JOB NO.: SF51103E

DATE: 7 89

PLATE 4



SCALE 1:24,000

REFERENCE: State of California Special Study Zones
 Calaveras Reservoir, 1982
 State of California Special Study Zones
 La Costa Valley, 1982

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 STRUCTURAL AND
 CIVIL ENGINEERS

SPECIAL STUDY ZONES FAULT MAP
 PROPOSED CALAVERAS PIPELINE

JOB NO.: SF51103E DATE: 7-89

PLATE 6

APPENDIX D

GEOLOGY MAPS

APRIL 1990

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SYMBOLS

INDIFFERENTIATED ALLUVIAL DEPOSITS
 RECENT ALLUVIAL DEPOSIT
 STREAM CHANNEL GRAVEL AND SAND
 LANDSLIDE DEBRIS
 OLDER ALLUVIUM
 FLOE WASH
 TERRACE DEPOSIT

MARINE COARSE PEBBLY SANDSTONE
 MARINE SANDSTONE
 MARINE SHALE
 MARINE SILTSTONE

PANOCHE FORMATION SHALE WITH INTERBEDDED
 SANDSTONE AND SILTSTONE

FRANCISCAN COMPLEX

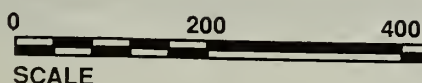
INCLUDES SHALE, CHERT, GLAUCOPHANE SCHIST,
 SANDSTONE, MELANGE, SERPENTINITE
 SHALE
 SANDSTONE

PARENTHESES INDICATE UNDERLYING LITHOLOGY

- CONTACT, DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED
-? FAULT, DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED, QUERIED WHERE UNCERTAIN.
- STRIKE AND DIP OF BEDDING
- SYNCLINE
- ANTICLINE
- PROPOSED PIPELINE ALIGNMENT
- B SEISMIC REFRACTION LINE
- TRENCH EXCAVATION
- 1 BORING LOCATION
- IS MINERAL SPRING
- 1 TEST PIT EXCAVATION

Modified from Dibblee, 1972
 Calaveras Reservoir Quadrangle

Modified from Dibblee, 1980
 La Costa Valley Quadrangle



AND EXPLORATION
 PIPELINE REPLACEMENT

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 STRUCTURAL, AND
 CIVIL ENGINEERS

DATE : 4/90

PLATE 2

LEGEND:

GEOLOGIC SYMBOLS

Qa UNDIFFERENTIATED ALLUVIAL DEPOSITS
 Qal RECENT ALLUVIAL DEPOSIT
 Qg STREAM CHANNEL GRAVEL AND SAND
 Qls LANDSLIDE DEBRIS
 Qoa OLDER ALLUVIUM
 Qsw SLOPE WASH
 Qt TERRACE DEPOSIT

Tmss MARINE COARSE PEBBLEY SANDSTONE
 Tss MARINE SANDSTONE
 Tsh MARINE SHALE
 Tsl MARINE SILTSTONE

Kp, Ksh PANOCHE FORMATION SHALE WITH INTERBEDDED SANDSTONE AND SILTSTONE

Kjl FRANCISCAN COMPLEX
 INCLUDES SHALE, CHERT, GLAUCOPHANE SCHIST, SANDSTONE, MELANGE, SERPENTINITE

Kjlfh SHALE
 Kjfs SANDSTONE

(Tss) PARANTHESES INDICATE UNDERLYING LITHOLOGY

— — — — — CONTACT, DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED

— · · · · ? FAULT, DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED, OUERIED WHERE UNCERTAIN.

40° INCLINED STRIKE AND DIP OF BEDDING

— — — — — SYNCLINE

— — — — — ANTICLINE

— — — — — PROPOSED PIPELINE ALIGNMENT

— — — — — SEISMIC REFRACTION LINE

— — — — — TRENCH EXCAVATION

○ B-1 BORING LOCATION

● H₂S MINERAL SPRING

□ TP-1 TEST PIT EXCAVATION

REFERENCE: Modified from Dibblee, 1972
 Calaveras Reservoir Quadrangle

Modified from Dibblee, 1980
 La Costa Valley Quadrangle

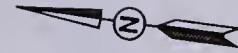
SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT

JOB NO. : SF91201

DATE : 4/90

PLATE 2

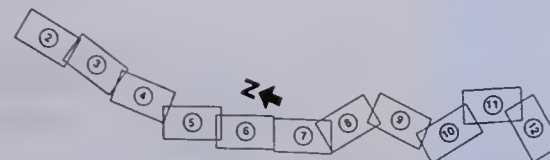
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MATCH LINE

MATCH LINE

0 200 400 600
 SCALE FEET



PLATES ARRANGEMENT

MATCH LINE

MATCH LINE

MATCH LINE

OR LEGEND SEE PLATE 2

0 200 400
SCALE

AND EXPLORATION
LINE REPLACEMENT

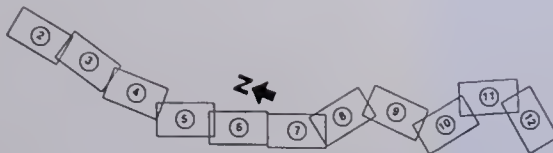
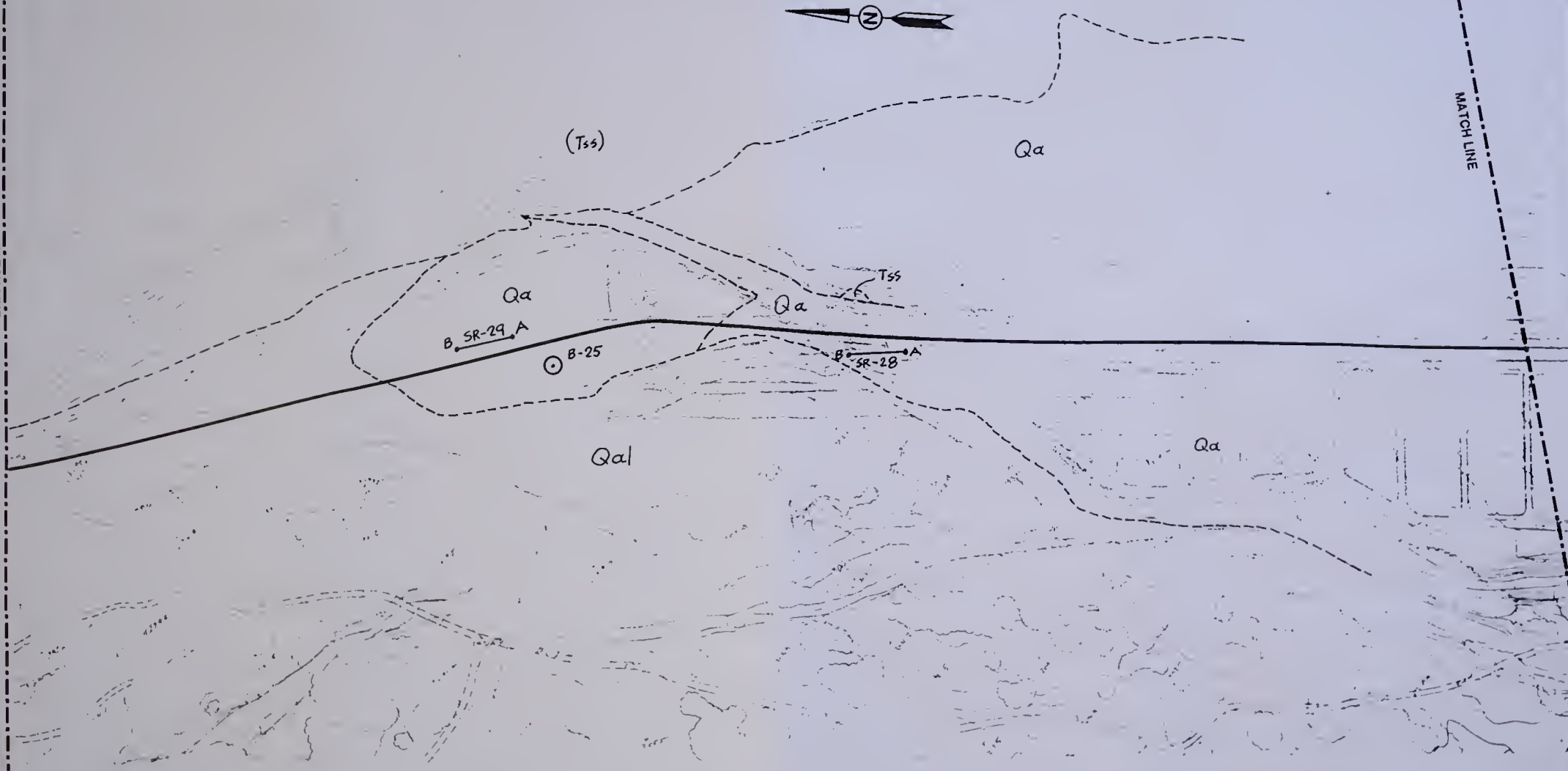
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STRUCTURAL, AND
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DATE : 4/90

PLATE 3

MATCH LINE

MATCH LINE



PLATES ARRANGEMENT

NOTE: FOR LEGEND SEE PLATE 2

SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT

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STRUCTURAL AND
CIVIL ENGINEERS

JOB NO. : SF91201

DATE : 4/90

PLATE 3

MATCH LINE

MATCH LINE

MATCH LINE

Qa

Qa

Qa

B-10

FOR LEGEND SEE PLATE 2

0 200 400

SCALE

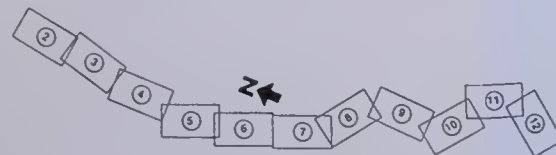
AND EXPLORATION
PIPELINE REPLACEMENT

AGS, Inc.
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CIVIL ENGINEERS

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PLATE 4

MATCH LINE



PLATES ARRANGEMENT

NOTE: FOR LEGEND SEE PLATE 2

SITE GEOLOGY AND EXPLORATION
CALAVERAS PIPELINE REPLACEMENT

AGS, Inc.
CONSULTING GEOTECHNICAL
STRUCTURAL AND
CIVIL ENGINEERS

JOB NO. : SF91201

DATE : 4/90

PLATE 4

MATCH LINE

MATCH LINE



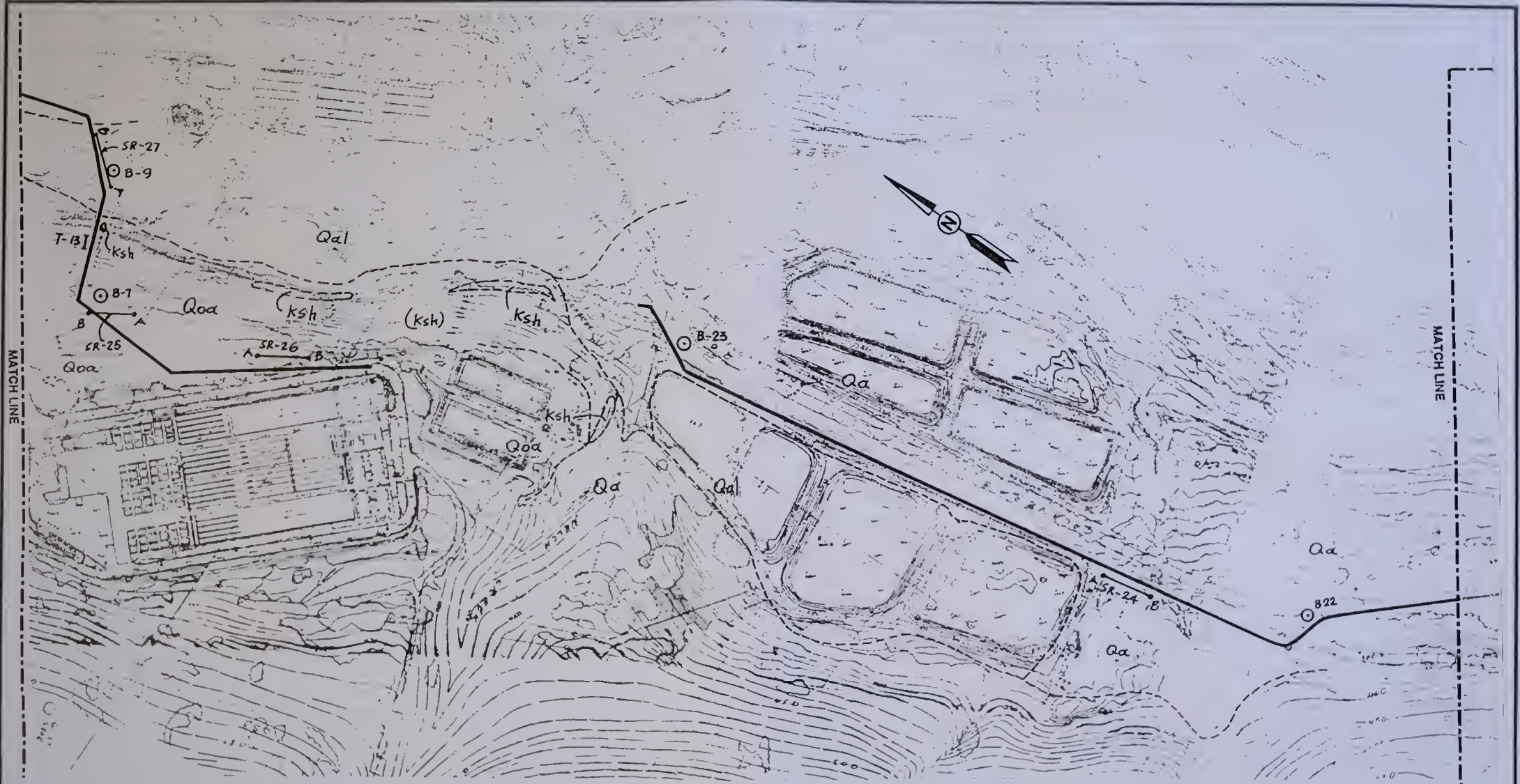
FOR LEGEND SEE PLATE 2

AND EXPLORATION
LINE REPLACEMENT

AGS, Inc.
CONSULTING GEOTECHNICAL
STRUCTURAL AND
CIVIL ENGINEERS

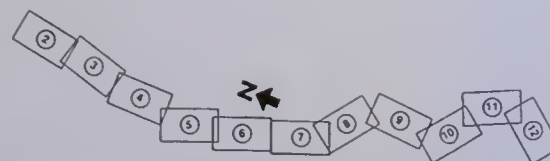
DATE : 4/90

PLATE 5



NOTE: FOR LEGEND SEE PLATE 2

0 200 400 600
SCALE FEET



PLATES ARRANGEMENT

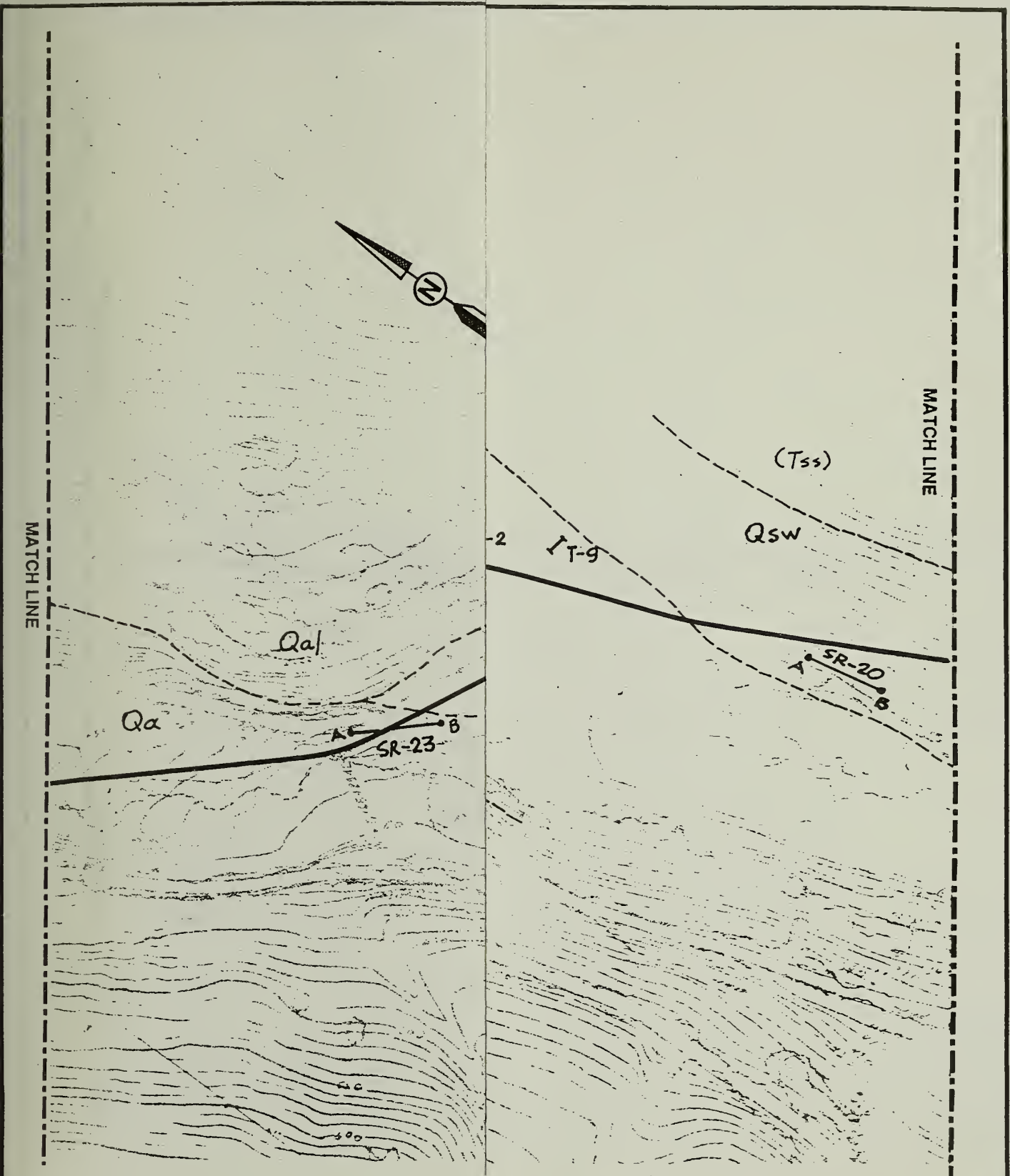
SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT

AGS, Inc.
CONSULTING GEOTECHNICAL
STRUCTURAL AND
CIVIL ENGINEERS

JOB NO. : SF91201

DATE : 4/90

PLATE 5



LEGEND SEE PLATE 2

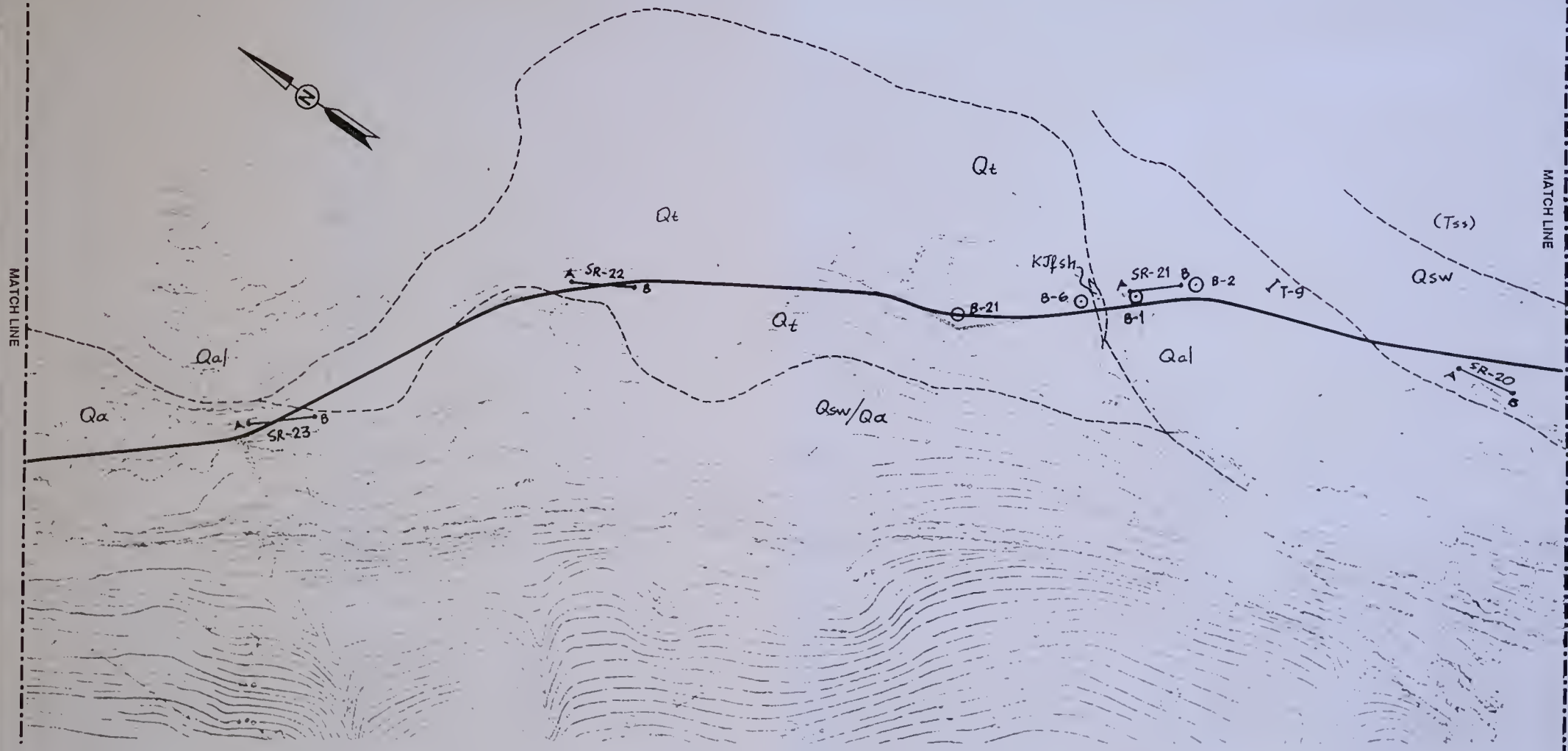


AND EXPLORATION
LINE REPLACEMENT

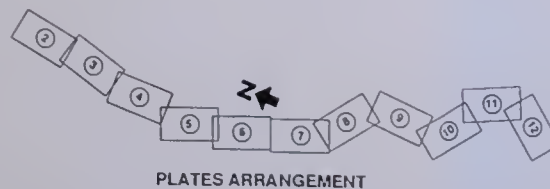
AGS, Inc.
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STRUCTURAL, AND
CIVIL ENGINEERS

DATE : 4/90

PLATE 6



NOTE: FOR LEGEND SEE PLATE 2



SITE GEOLOGY AND EXPLORATION **CALAVERAS PIPELINE REPLACEMENT**

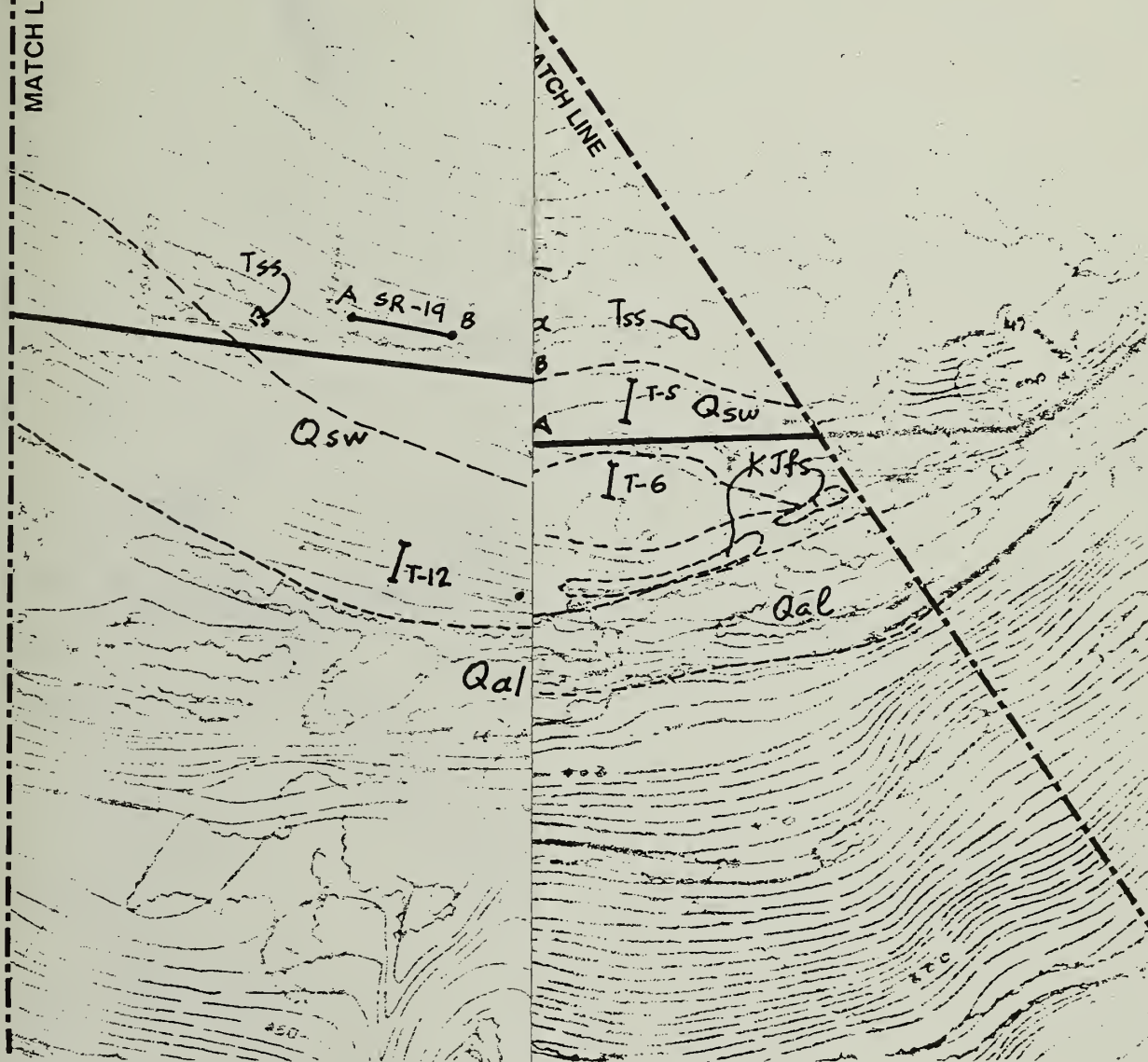
AGS, Inc.
 CONSULTING GEOTECHNICAL
 STRUCTURAL AND
 CIVIL ENGINEERS

JOB NO. : SF91201

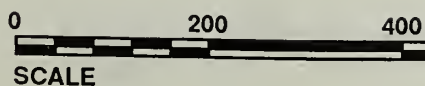
DATE : 4/90

PLATE 6

MATCH LINE



FOR LEGEND SEE PLATE 2



AND EXPLORATION
PELINE REPLACEMENT

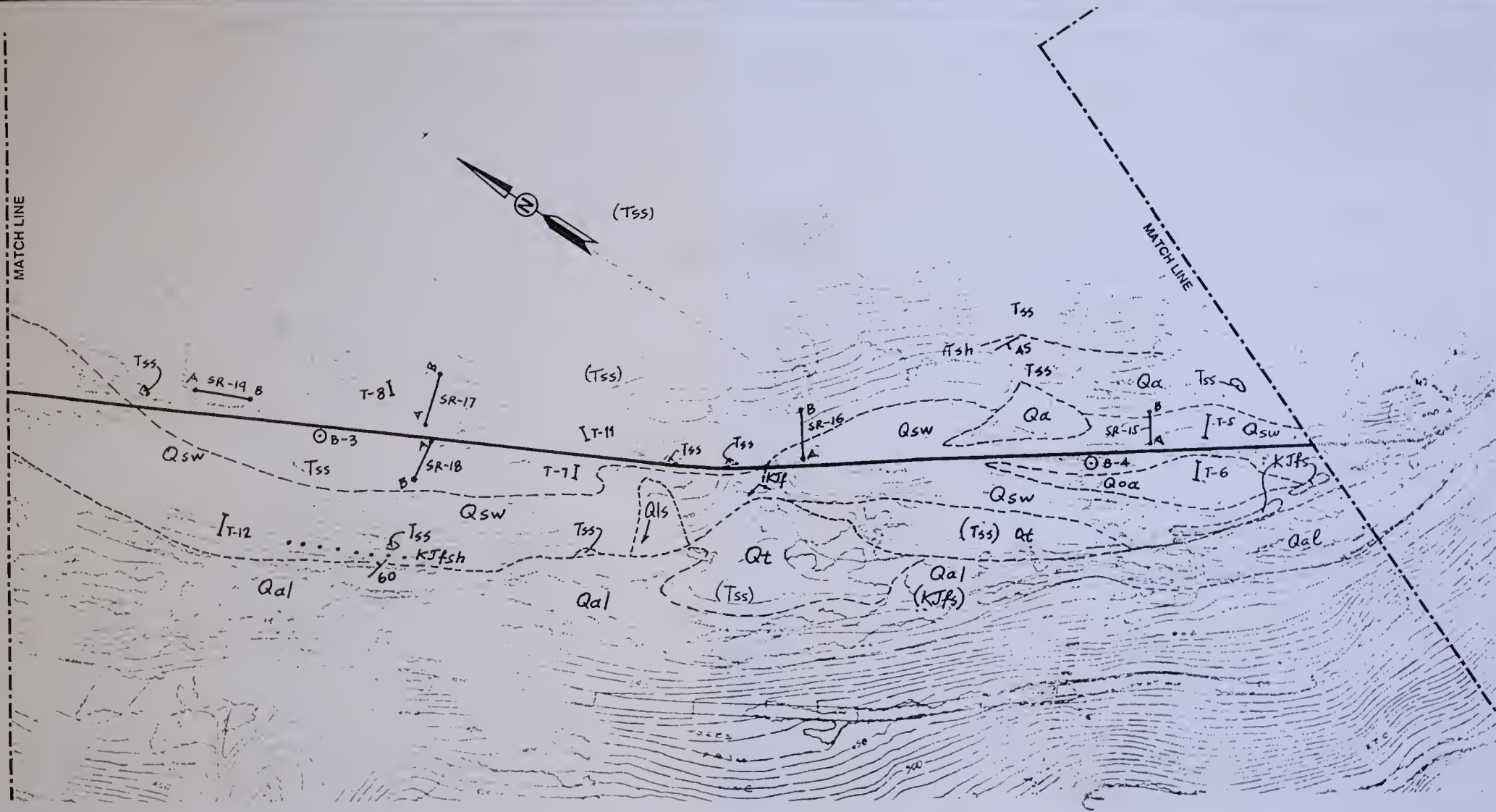
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STRUCTURAL, AND
CIVIL ENGINEERS

DATE : 4/90

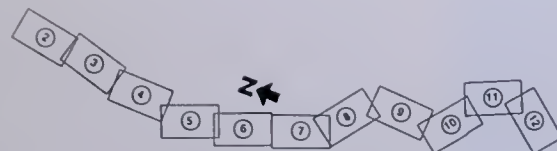
PLATE 7

MATCH LINE

MATCH LINE



NOTE: FOR LEGEND SEE PLATE 2



PLATES ARRANGEMENT

SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT

AGS, Inc.
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STRUCTURAL AND
CIVIL ENGINEERS

JOB NO. : SF91201

DATE : 4/90

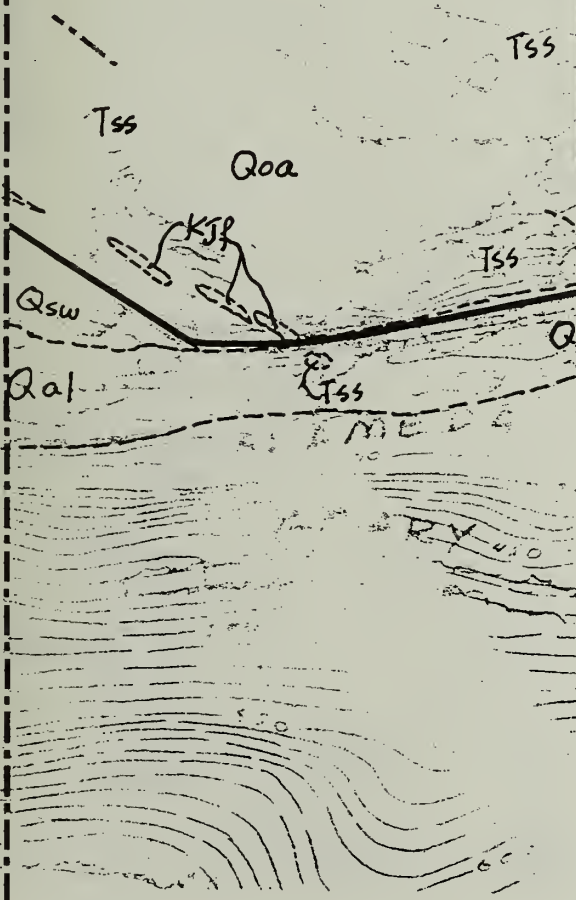
PLATE 7

MATCH LINE

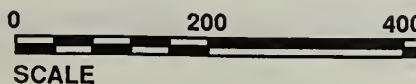


MATCH LINE

MATCH LINE



END SEE PLATE 2

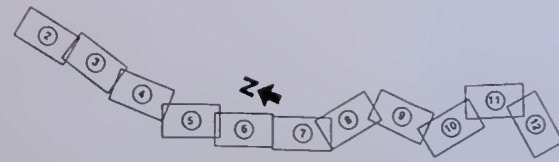
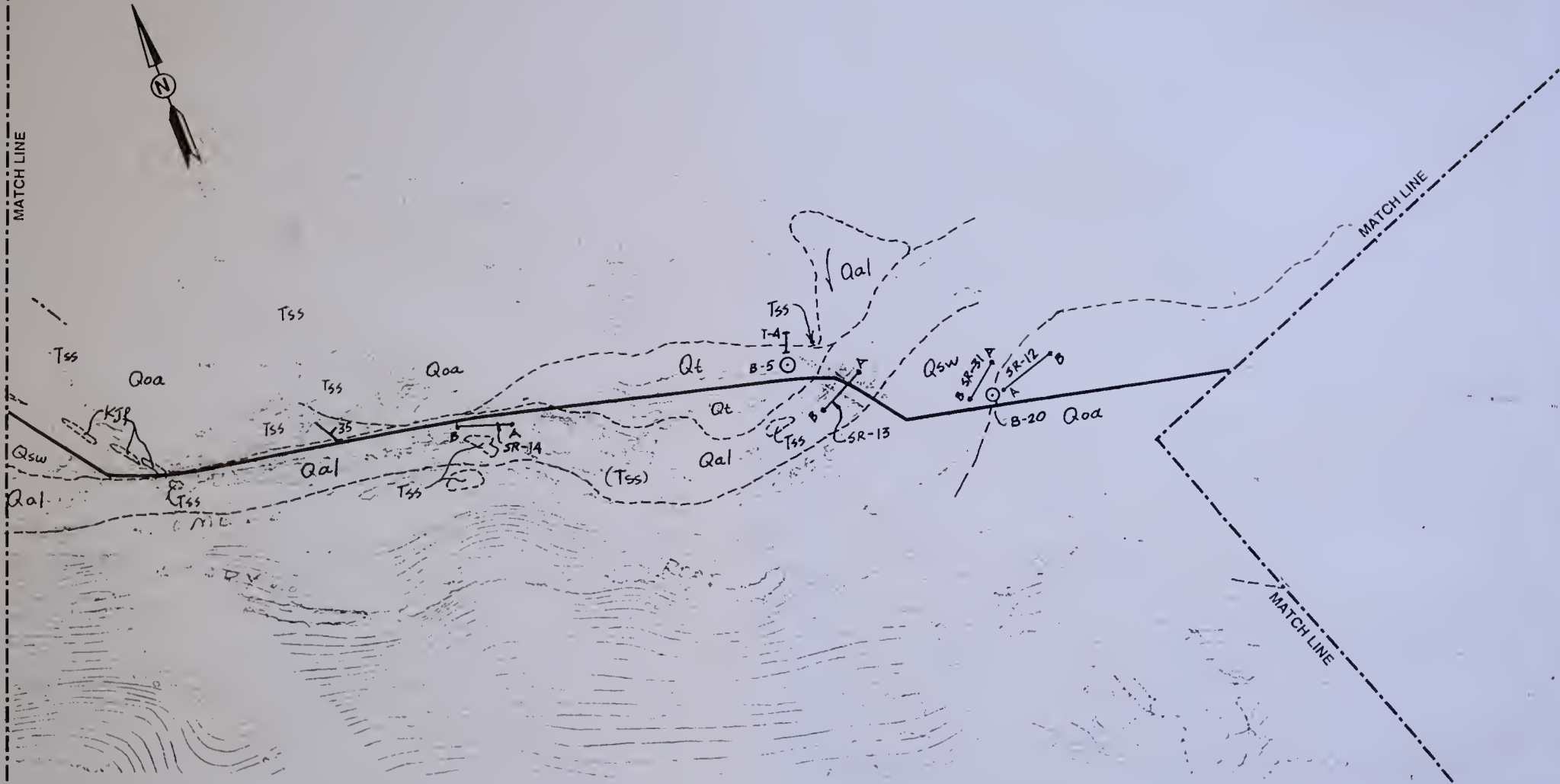


AND EXPLORATION
LINE REPLACEMENT

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STRUCTURAL, AND
CIVIL ENGINEERS

DATE : 4/90

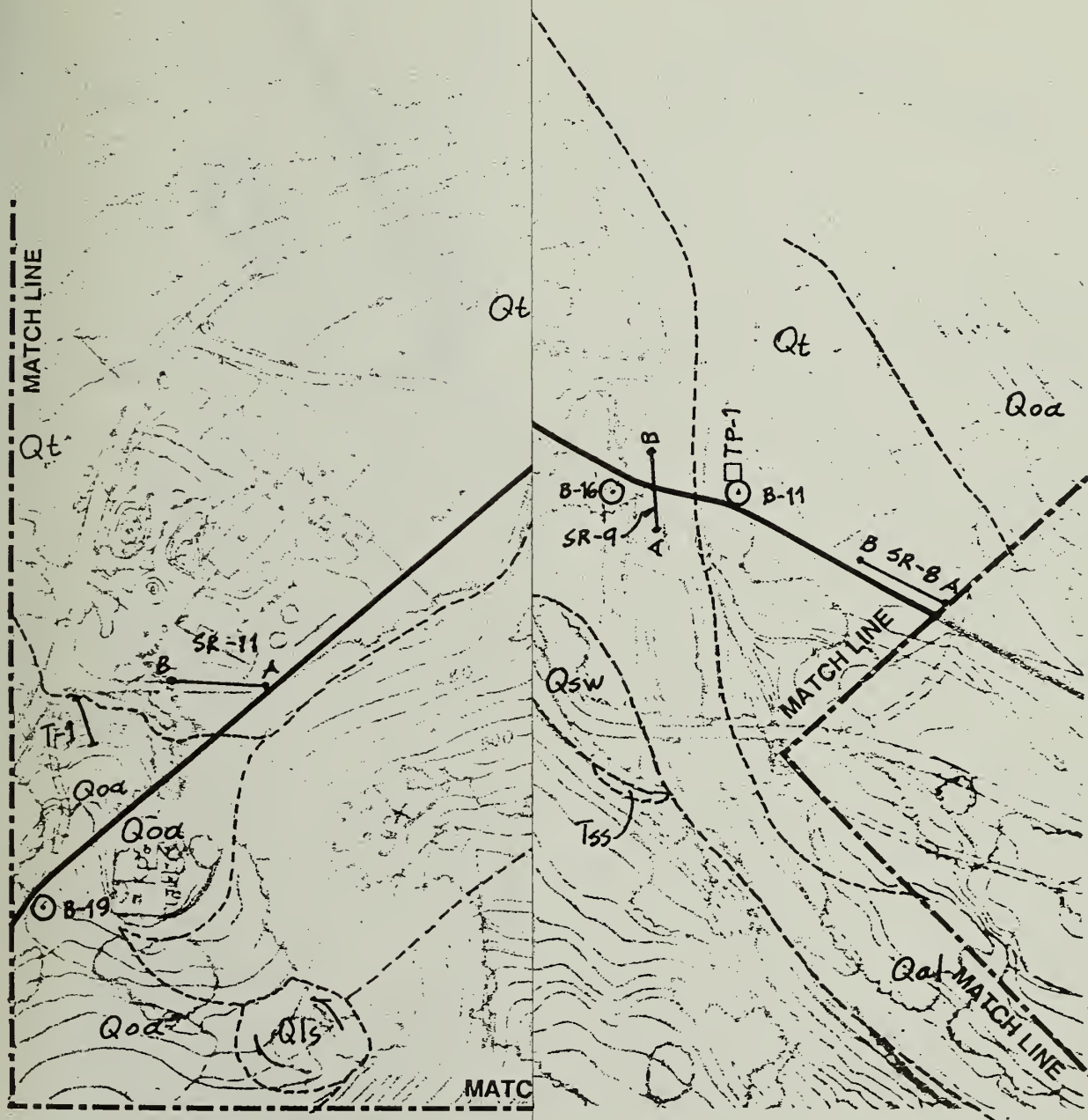
PLATE 8



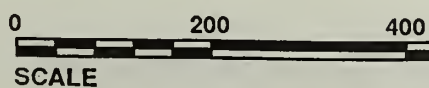
PLATES ARRANGEMENT

NOTE: FOR LEGEND SEE PLATE 2

SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT		AGS, Inc. CONSULTING GEOTECHNICAL STRUCTURAL AND CIVIL ENGINEERS
JOB NO. :	SF91201	
DATE :	4/90	PLATE 8



END SEE PLATE 2

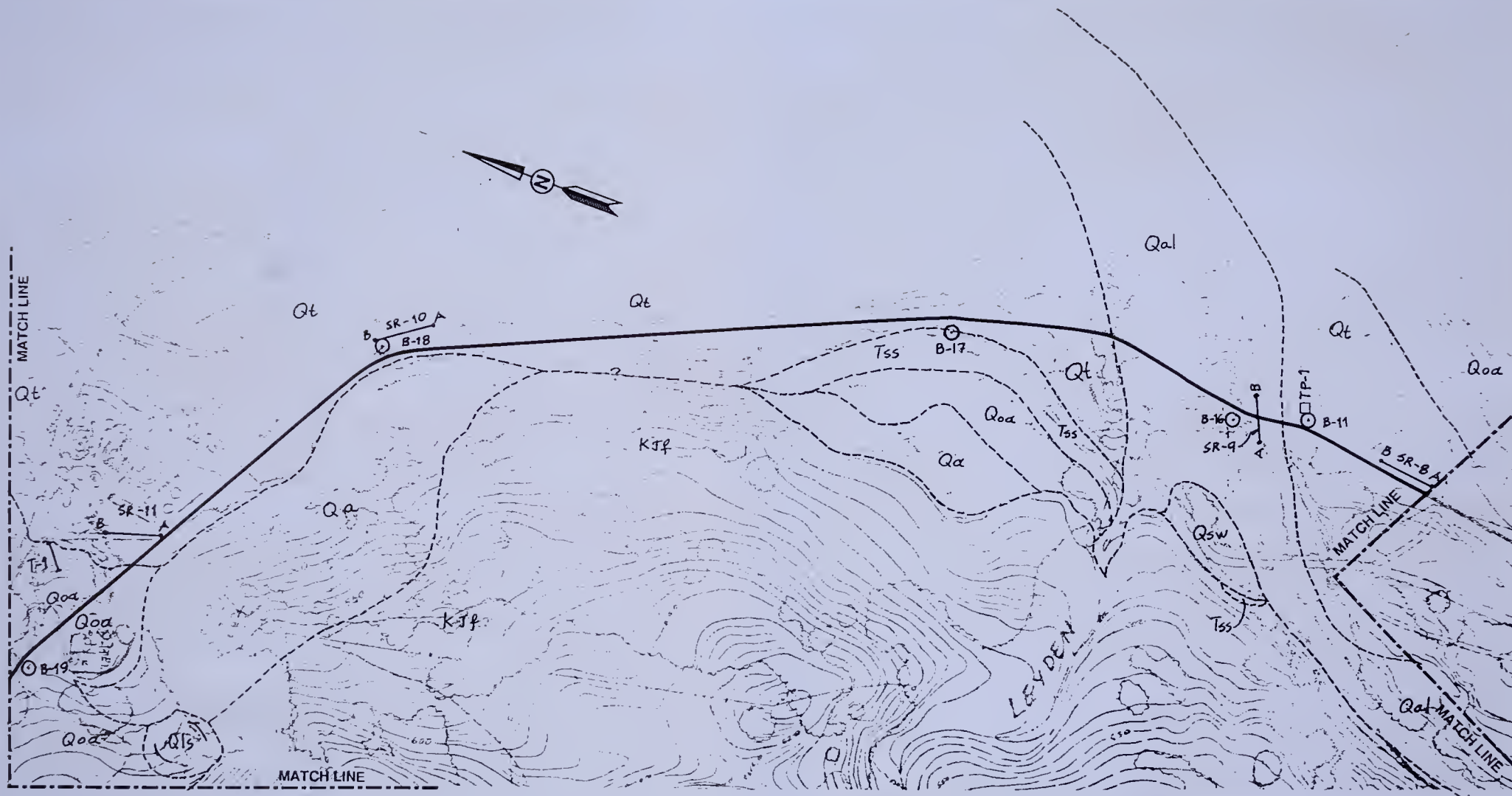


AND EXPLORATION: ELINE REPLACEMENT

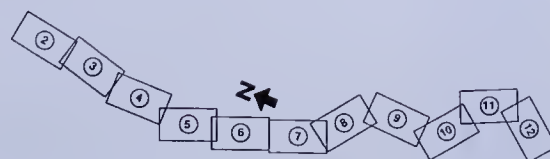
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CIVIL ENGINEERS

DATE : 4/90

PLATE 9



NOTE: FOR LEGEND SEE PLATE 2



PLATES ARRANGEMENT

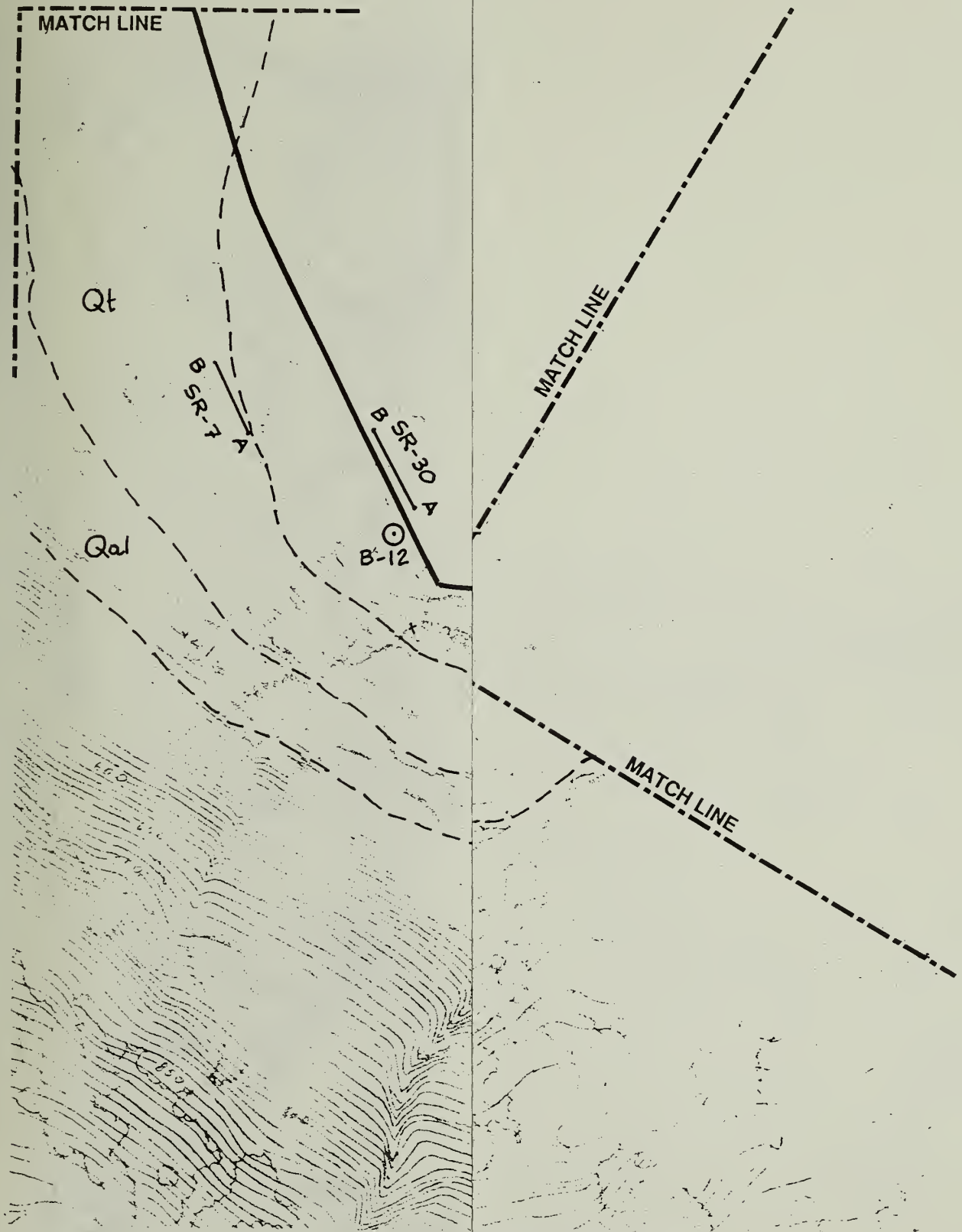
SITE GEOLOGY AND EXPLORATION CALAVERAS PIPELINE REPLACEMENT

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STRUCTURAL AND
CIVIL ENGINEERS

JOB NO. : SF91201

DATE : 4/90

PLATE 9



LEGEND SEE PLATE 2



AND EXPLORATION
ELINE REPLACEMENT

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STRUCTURAL AND
CIVIL ENGINEERS

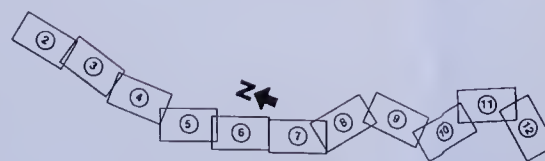
DATE : 4/90

PLATE 10



NOTE: FOR LEGEND SEE PLATE 2

0 200 400 600
SCALE FEET



PLATES ARRANGEMENT

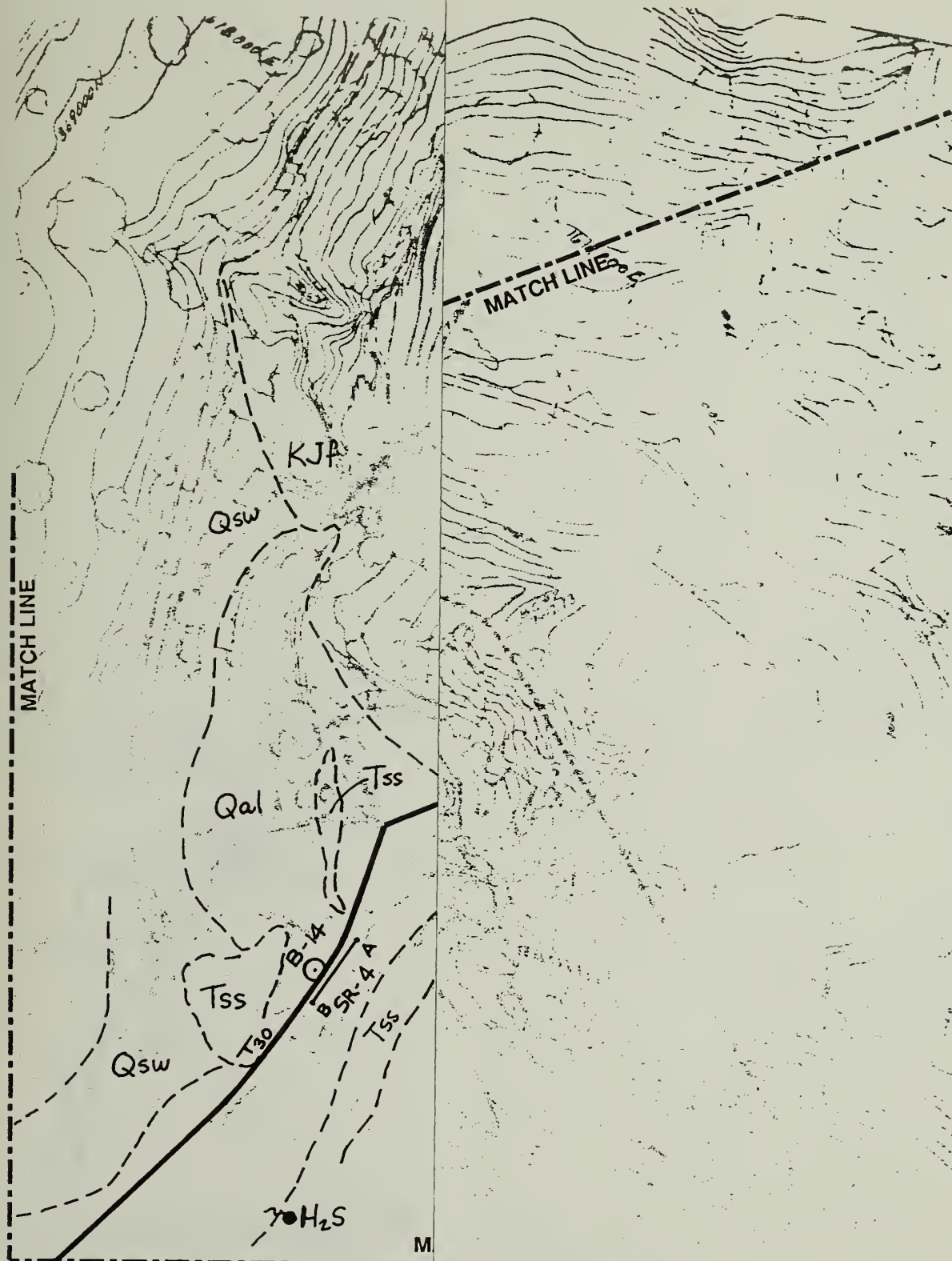
SITE GEOLOGY AND EXPLORATION **CALAVERAS PIPELINE REPLACEMENT**

JOB NO.: SF91201

DATE: 4/90

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PLATE 10



LEGEND SEE PLATE 2
SECTION B-B' SEE PLATE 57

0 200
SCALE

AND EXPLORATION
PIPELINE REPLACEMENT

AGS, Inc.
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STRUCTURAL, AND
CIVIL ENGINEERS

1

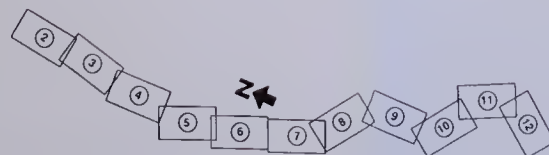
DATE : 4/90

PLATE 11



- NOTES: 1. FOR LEGEND SEE PLATE 2
2. FOR SECTION B-B' SEE PLATE 57

0 200 400 600
SCALE FEET



PLATES ARRANGEMENT

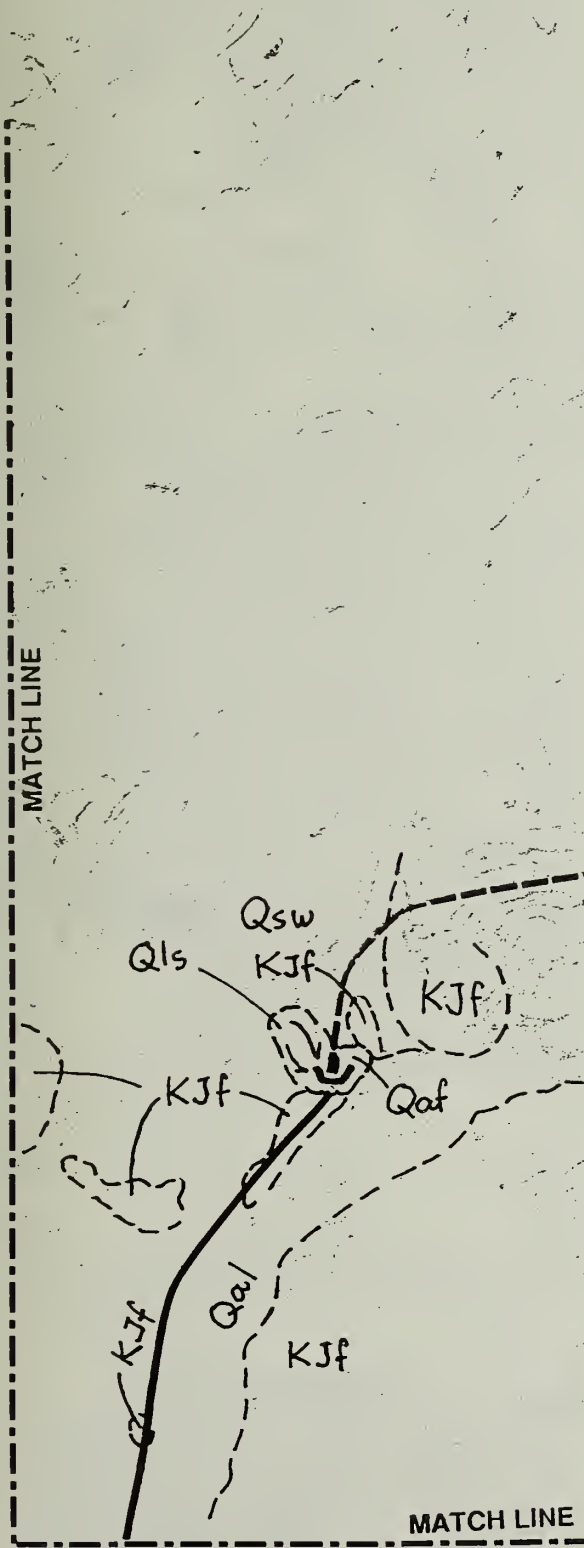
SITE GEOLOGY AND EXPLORATION
CALAVERAS PIPELINE REPLACEMENT

JOB NO. : SF91201

DATE : 4/90

PLATE 11

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FOR LEGEND SEE PLATE 2
FOR SECTION A-A' SEE PLATE 56



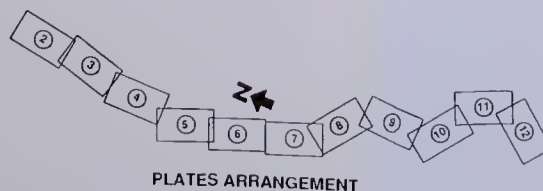
AND EXPLORATION

PELINE REPLACEMENT

AGS, Inc.
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STRUCTURAL, AND
CIVIL ENGINEERS



- NOTES: 1. FOR LEGEND SEE PLATE 2
2. FOR SECTION A-A' SEE PLATE 56



A-75

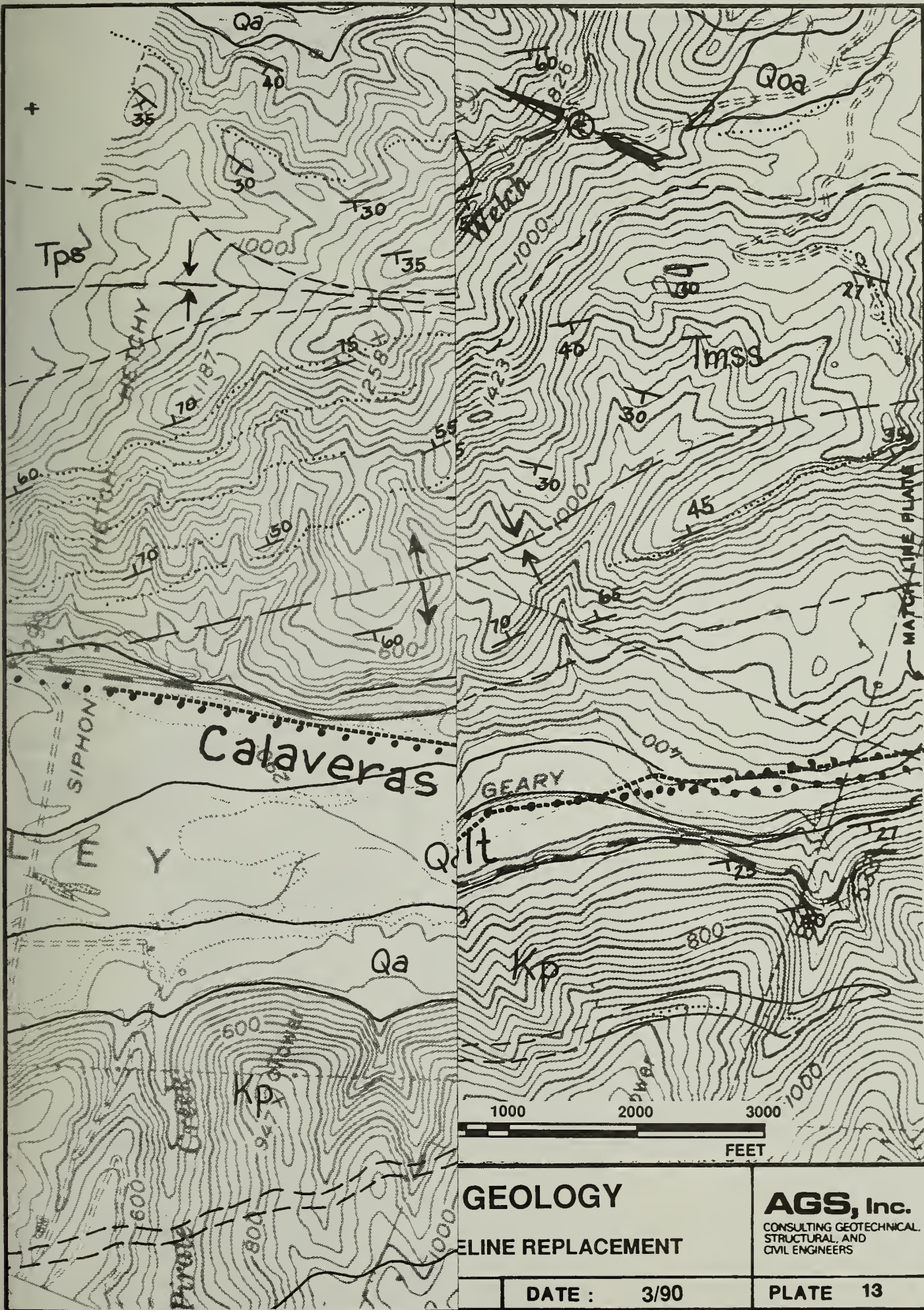
SITE GEOLOGY AND EXPLORATION
CALAVERAS PIPELINE REPLACEMENT

JOB NO. : SF91201

DATE : 4/90

PLATE 12

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GEOLOGY

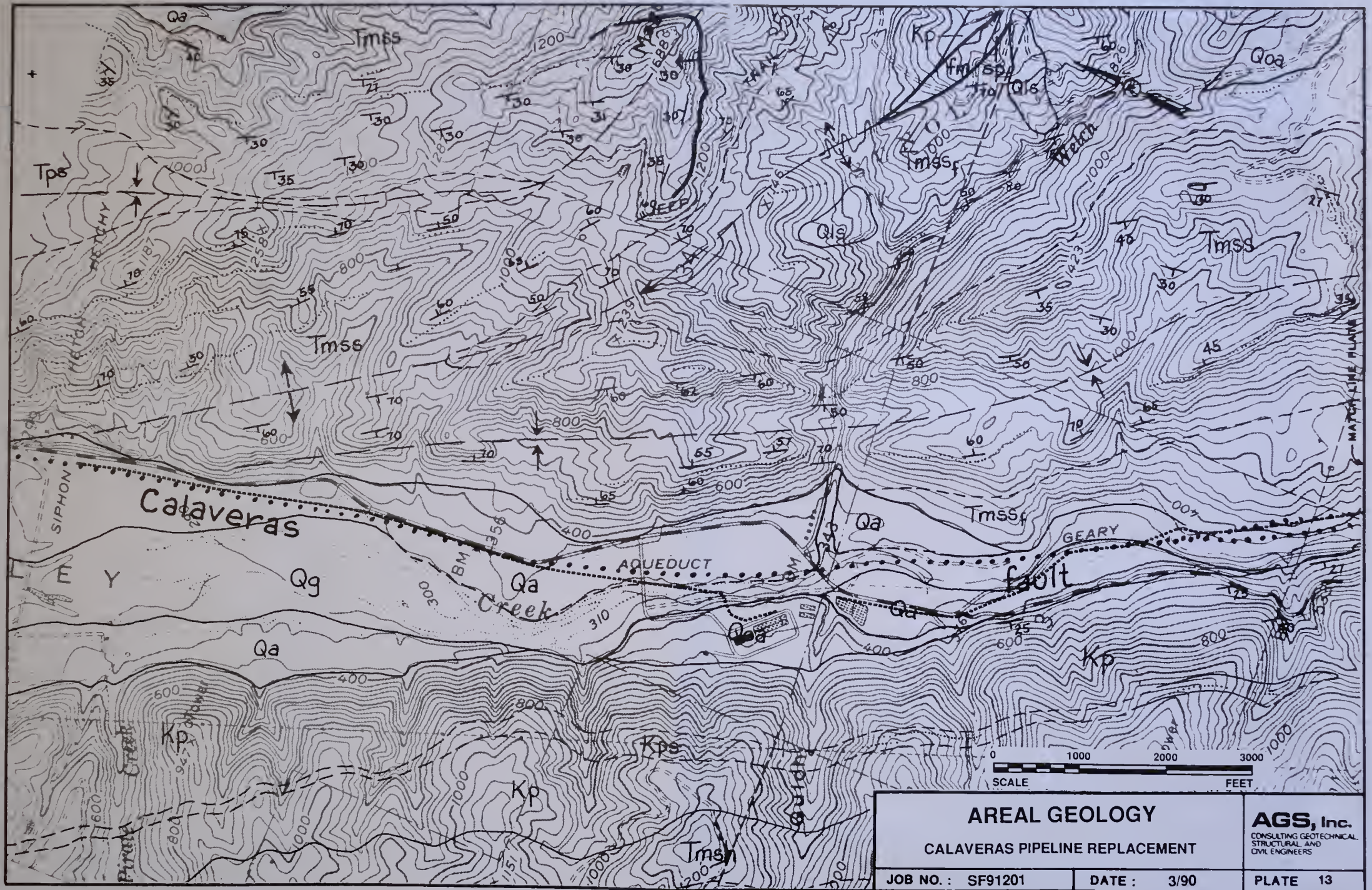
ELINE REPLACEMENT

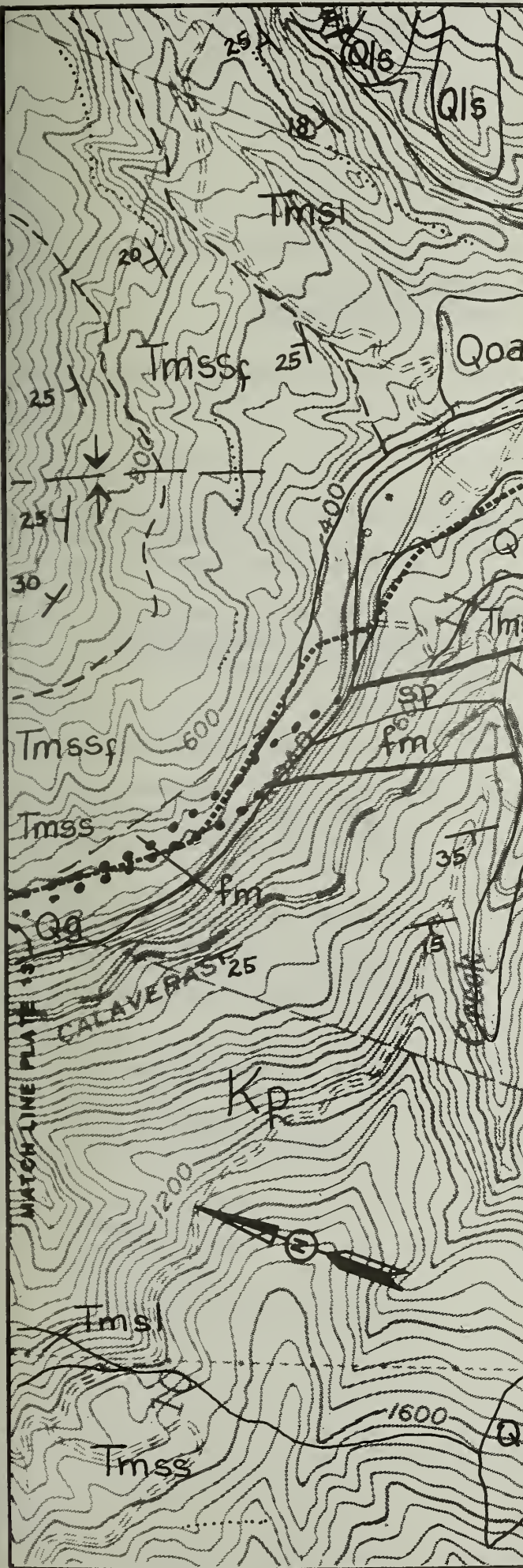
AGS, Inc.

CONSULTING GEOTECHNICAL
STRUCTURAL AND
CIVIL ENGINEERS

DATE : 3/90

PLATE 13





LEGEND:

GEOLOGIC SYMBOLS

Qa	ALLUVIUM
Qg	STREAM CHANNEL GRAVEL AND SAND
Qls	LANDSLIDE DEBRIS
Qoa	OLDER ALLUVIUM
Qsw	SLOPE WASH
Qr	MAN MADE ROCK FILL
Tps	NONMARINE SEDIMENTARY ROCKS, PEBBLE CONGLOMERATE, CLAY AND SAND
Tmss	MARINE COARSE PEBBLEY SANDSTONE
Tmsh	MARINE SILICEOUS SHALE
Tmsl	MARINE SILTSTONE AND CLAYSTONE
Tmsa	MARINE BASAL CONGLOMERATE
Kp	PANOCHÉ FORMATION SHALE
Kps	PANOCHÉ FORMATION SANDSTONE

FRANCISCAN COMPLEX

fc	CHERT
fm	MELANGE
fs, fss	SANDSTONE
gl	GLAUCOPHANE SCHIST
sp	SERPENTINITE

—	CONTACT, DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED
.....?	FAULT, DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED, QUERIED WHERE UNCERTAIN.
- - - -	SANDSTONE BED
—	ED
—	AL
—	URNED
—	STRIKE AND DIP OF BEDDING
- - - -	SYNCLINE
↑ ↓	ANTICLINE
—	IMPROVEMENTS
.....	PROPOSED PIPELINE ALIGNMENT

ENCE: Modified from Dibblee, 1972
Calaveras Reservoir Quadrangle

Modified from Dibblee, 1980
La Costa Valley Quadrangle

GEOLOGY

PIPELINE REPLACEMENT

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STRUCTURAL, AND
CIVIL ENGINEERS

DATE : 3/90

PLATE 14

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